

THE IRON AGE

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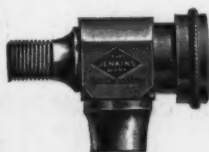
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THE IRON AGE

New York, Thursday, June 24, 1909.

Coaling Station at Guantanamo, Cuba.

BY W. P. ENGELMAN.

At the end of the Spanish-American War the United States Government, recognizing the urgency of a naval base in Cuban waters, acquired territory on the Guantanamo Bay for installing equipment to store coal from

chutes alongside the collier into tip cars. These cars ran on a narrow gauge railroad laid on the wharf and at desired points over the coal storage area. A stevedore force of 70 men was employed, and with the use of the collier's derricks handled a maximum tonnage per day of 350 to 400 tons. This was a comparatively small tonnage, entailed a high labor charge per ton of coal handled, and the employment of an unwieldy labor force,

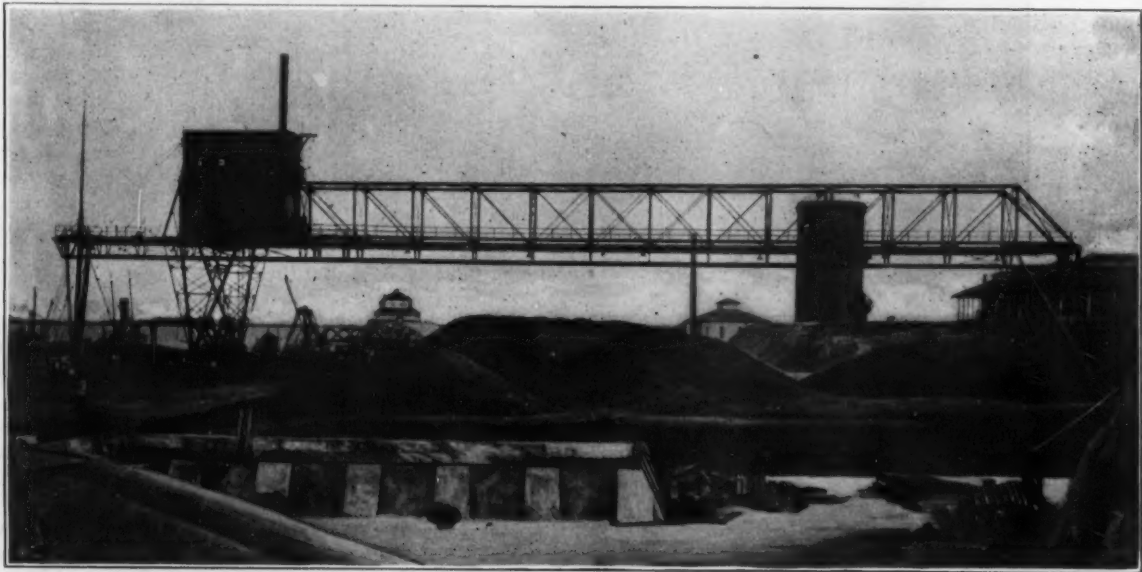


Fig. 1.

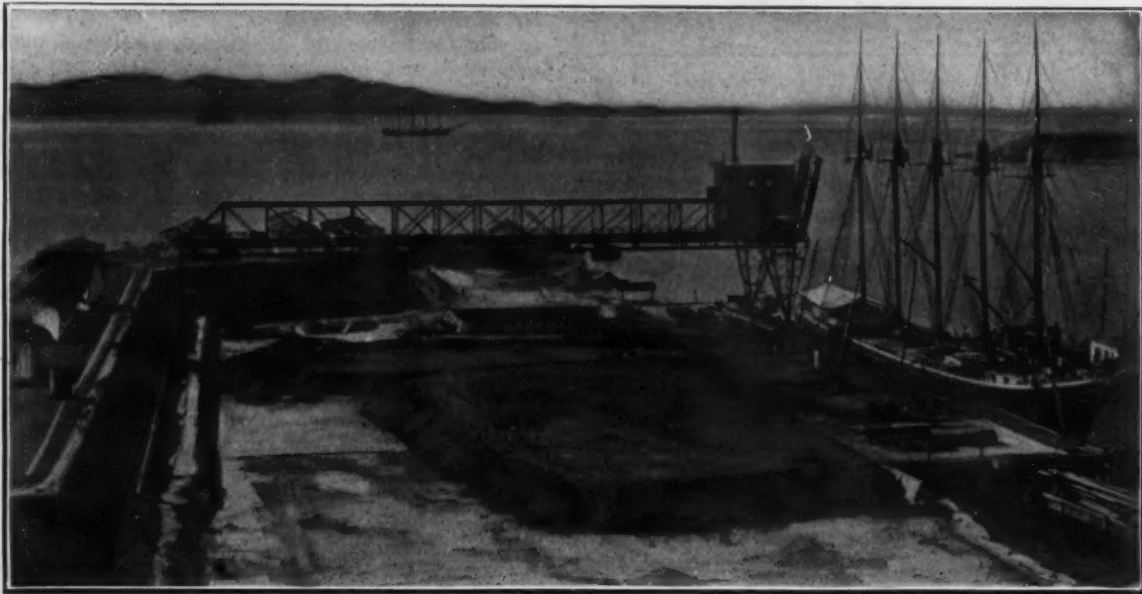


Fig. 2.

General Views of the Coal Handling Equipment Installed for the United States Government at Guantanamo, Cuba, by the C. W. Hunt Company.

colliers, and also to coal the naval vessels or fleets using the Southern waters.

Near Hospital Cay a channel was dredged for water approach, a concrete wharf on piling built, having a frontage of 340 ft. and a depth of 70 ft., and a coal storage basin prepared of 68,000 sq. ft. on the coral reefs in the rear of the wharf.

For immediate need a temporary coal handling and storing equipment was installed. The coal was unloaded by the collier's steam-operated swinging derricks, hoisting coal from three hatches and dumping the coal over

difficult to maintain, owing to the remoteness of the station from any labor center. In consequence of these disadvantages, as soon as additional appropriations were available, steps were taken to install a modern, high speed coaling station to transfer coal from colliers to the storage area and from this storage area to the naval vessels.

Various plants of this character were investigated, including the one of the Delaware & Hudson Railroad at Delanson, N. Y., which was installed in 1907 by the C. W. Hunt Company, West New Brighton, New York,

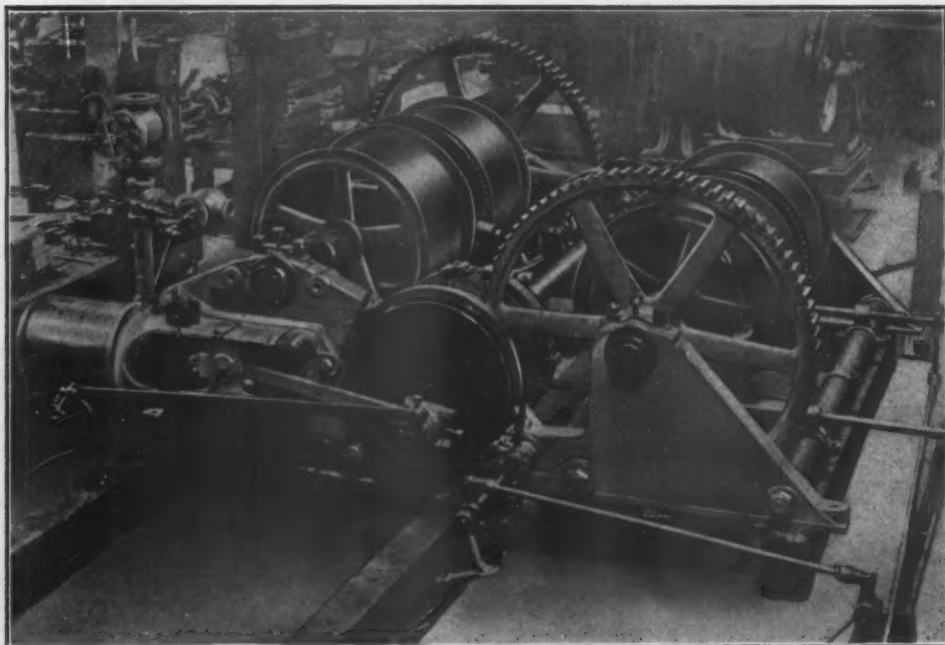


Fig. 3.—The 140-Hp. Two-Cylinder, Four-Drum, Balanced Main Hoisting Engine.

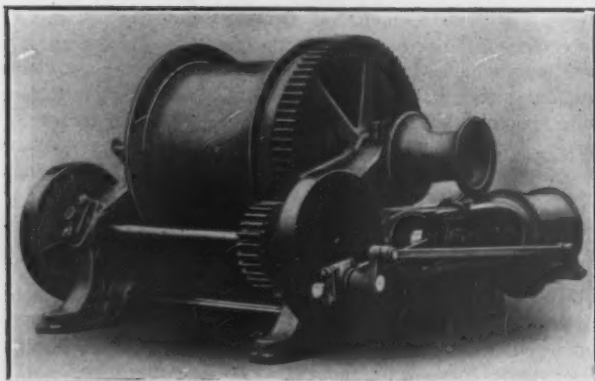


Fig. 4.—The 60-Hp. Single-Drum, Direct-Geared, Boom Hoisting Engine.

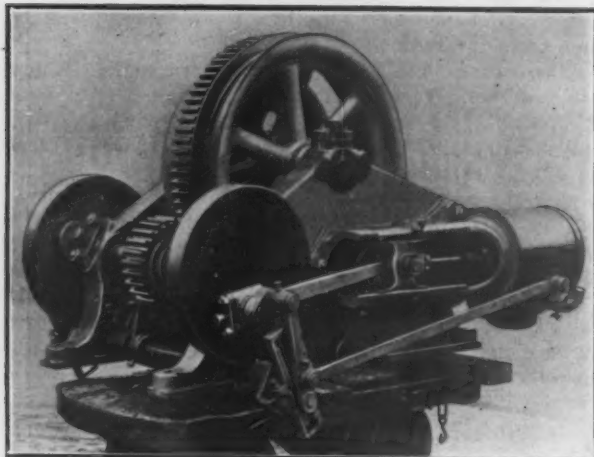


Fig. 5.—The 60-Hp. Single-Drum, Double-Cylinder, Reversible-Gear Trolley Engine.

where 3000 tons of coal is handled per day with one machine, and it was decided to install a similar equipment at Guantanamo.

The operating machinery of this plant, of which Figs. 1 and 2 give general views, consists of the following:

A 125-hp. boiler to generate steam for the engines, including one directly connected to a 35-kw. electric generator, furnishing current for moving the tower trucks and lighting the plant; a 140-hp. main hoisting engine, two-cylinder, four-drum, balanced type, to operate the hoisting ropes (Fig. 3); a 60-hp. boom hoisting engine, single-drum, direct-geared type, with friction clutch and band brake to raise and lower the boom when it is desired to move the tower from one vessel hatch to the other, which

is also provided with a separate winch head for hoisting the coal required for the boiler (Fig. 4); a 60-hp. trolley engine, single-drum, double-cylinder, reversible-gear type to run the trolley in and out over the boom (Fig. 5); a four-wheel boom truck complete with deflecting sheaves mounted on steel frames for conveying the grab bucket in and out over the boom; a $2\frac{1}{2}$ -ton capacity steam shovel or grab bucket (Fig. 6); a full set of hoisting and traversing ropes of length to traverse the entire length of the bridge and provide extra wraps on the engine drums and to operate the grab bucket at any point from the underside of bridge to 30 ft. below water level, or through a vertical height of 80 ft., and approximately 300 ft. along the bridge; two 25-hp. electric motors for moving the tower over the storage area; and the necessary track and equipment for a runway 340 ft. along the storage area.

The operating machinery is mounted on a structural steel frame or bridge, the underside of which is 52 ft. above mean low water level, spanning the storage area, with a distance center to center of tracks of 261 ft. This bridge is supported by four structural steel legs, each mounted on a universal truck for moving the tower lengthwise over the storage area. The tower is propelled by direct-current series motors, geared to the driving wheels of the truck, one motor on the forward truck for each track. These motors are operated from one con-

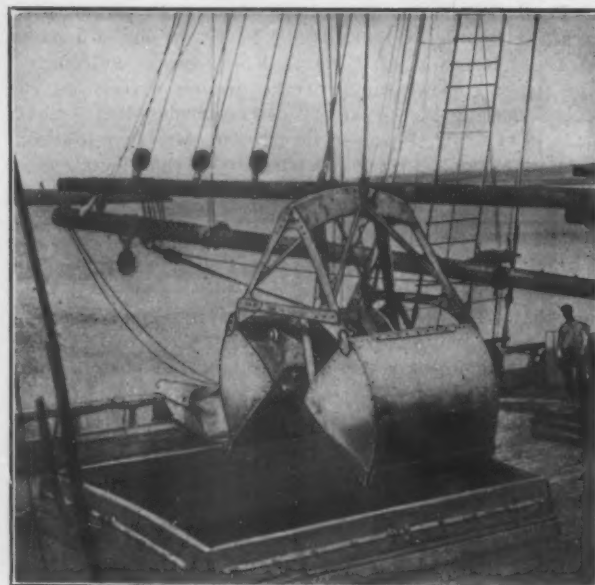


Fig. 6.—The $2\frac{1}{2}$ -Ton Grab Bucket Entering the Hold of a Vessel.

trolley in the operating room of the tower, and a constant speed motor is used at the land end and a variable speed motor at the water end so that the bridge may be kept in alignment.

The coal handling machinery is operated by steam power, because it was considered that reliability of operation in emergencies, economy of maintenance and easy regulation of operating speed are in its favor. The operating machinery is housed at a central point and requires two operators, one to control the lowering, filling and raising of the $2\frac{1}{2}$ -ton grab bucket, the other to control the running in and out of the trolley truck over the boom and the discharging of the bucket over the storage area. Fig. 1 shows the 40-ft. projecting boom placed in a horizontal plane over the vessel, while Fig. 2 shows the boom raised to permit the moving of the bridge from one vessel hatch to another. As indicated, this boom is hinged so that it may be raised to clear any obstructions, such as the masts or funnels of the vessel.

As will be seen from Figs. 3, 4 and 5, the engines are all of the Hunt heavy duty type, massive in construction and especially designed for heavy continuous duty, insuring durability in service, economy of steam and low maintenance cost. The grab bucket or shovel, Fig. 6, is of special construction, in that it is symmetrical as regards its center of gravity, thus avoiding the usual chafing and wear on the operating rope; the reach of the scoops is adjustable, so that the bucket will operate with equal facility on various grades of coal, and the bucket has exceptionally great closing power, stiffness and strength. The illustration shows the shovel, with the scoops opened, just at the point of entering the open hatchway of the vessel. The usual dimensions of this hatchway are 10 by 12 ft.

After an eight-hour continuous test November 25, 1908, in which the plant developed a capacity of 100 per cent. over and above that guaranteed by the builder, it was officially accepted by the Naval Bureau. The machinery has been in continuous operation since and with complete success, reducing the labor force at the plant from 70 men, as in the first installation, to two engineers and a fireman, besides working to a capacity which could not be approached by the previous system. The speed of the plant is best appreciated when it is stated that the bucket enters the narrow hatchway, is automatically closed, loading itself with $2\frac{1}{2}$ tons of coal, hoisted a vertical height of 50 to 70 ft., transferred along the boom and across the storage area a distance of 110 to 300 ft., automatically dumped and returned to the hatchway in from 40 to 45 sec.

The Economic Position of the Electric Steel Furnace.

At the Harrisburg meeting of the Engineers' Society of Pennsylvania on June 10 P. McNiven Bennie, Fitzgerald & Bennie, Niagara Falls, N. Y., presented a paper on the "Relation of Electric Furnaces to Siderurgy." The paper reviews much of the ground covered at the recent meeting of the American Electrochemical Society. It is interesting, however, to present Mr. Bennie's conclusions as to the economic position of the electric steel furnace as follows:

First, as to high grade steel, the electric furnace is rapidly becoming a serious competitor of the crucible method, for the simple reason that it is less expensive. Against a high cost of labor, crucible renewals and the fact that steel must be melted in small units, we have a lower labor cost, small cost for refractories, and the possibility of handling several tons of metal of uniform composition.

Second, as to steel for structural and rail purposes, the electric furnace is so far only asking recognition as a useful adjunct to existing apparatus, for doing additional refining or treatment in an economical and expeditious manner. Not a rival, but an ally, in the general siderurgical scheme.

Third, for steel castings the electric furnace cannot compete with open hearth castings, but for a grade somewhat better, where additional refining would be required,

the electric furnace has decided advantages. For castings of crucible quality the electric furnace methods will give satisfactory results at less cost than crucibles. In addition, for heavy castings the larger quantity of metal which can be treated as a unit is of much importance.

It is undoubtedly a fact, to which all who have seen an electric steel furnace in operation will bear witness, that higher temperatures are at the command of the metallurgist than heretofore. Generally speaking, refining operations can be carried on more rapidly and thoroughly with higher temperatures. Whether any substantial good is accomplished by additional refining, we shall have to leave to the steel makers, when they shall have come to agreement among themselves as to that point. I heard it said recently by a metallurgical engineer that product with just as good analysis could be made in any ordinary furnace as in the electric furnace. The truth of this contention is granted, but not the implied conclusion that analysis is the whole story. Given a choice between two steels, of identical price and analysis, one of which is known to be the product of the crucible process and the other of the open hearth process, would any engineer hesitate?

As to the electric furnace, if it can produce an improvement in quality, worth more than the increased cost, its future is assured. All electric steel furnaces work under basic conditions, even those used for tool steels. It has been found in Germany, for example, that steel is improved by simply putting it into an induction furnace, leaving it there for an hour or two, without attempting any refining by slags, meanwhile supplying only sufficient energy to maintain the temperature. It is believed that this gives dissolved gases an easy opportunity to escape. Finally, the following improvements may be looked for:

Electrodes of larger size and quality that will reduce the present consumption per ton.

Refractory materials superior to those now in use, and probably themselves the product of electric furnaces, such as fused alumina and other refractory oxides. In electric furnaces where an arc is present there is considerable vapor formed by volatilization of silicon, calcium, calcium oxide and even iron itself, which vapors are very active chemically, attacking the walls and roofs of the furnace. The destruction of the roof in electric furnaces is probably due as much to these vapors as to the high temperatures.

Increase in size and capacity of furnaces. Keller can now build furnaces for treating molten steel with a capacity of 10 to 12 tons. Robert Turnbull, Dr. Heroult's engineer, is confident that 15-ton furnaces present no difficulties whatever.

For the first time electric furnace steel was reported in the German returns of production for 1908. The amount was 20,000 tons. When it is considered that electric furnaces charged with molten metal are good for 10 heats daily it will be seen that with a total daily capacity of from 100 to 150 tons of steel the electric furnace may fairly be said to have emerged from the metallurgical nursery.

M. Schiffer, who makes a specialty of breaking up and removing salamanders from blast furnaces, has taken offices at 9140 Commercial avenue, Chicago. By the application of methods devised by him he undertakes to prevent personal accidents and damages to property which often happens in the execution of this work. The safe removal of a 400-ton salamander from No. 7 blast furnace in the South Works of the Illinois Steel Company was recently accomplished under his direction.

A Washington dispatch says that the removal of the Curtis turbines from the Southern Pacific liner Creole, which has been laid up at New York for some time, will not cause any change in the specifications of the new battleship North Dakota, which call for its equipment with the same type of engines. It is stated that the machinery of the Creole was among the first turned out of the Curtis type and that important improvements have been made meantime.

A Lodge & Shipley Lathe for Automobile Hubs.

A lathe built by the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, for the rapid machining of automobile hubs is shown in Fig. 1. Two of the features that contribute most to the high producing capacity were directly at hand in the company's patent head which facilitates changes of spindle speeds according to the requirements, and the turret on the bed which, in connection with the tool in the compound rest, permits

turned to on one piece, after the carriage had encountered the first longitudinal stop, the turning tool would be set for the second diameter by bringing the corresponding compound rest stop into position, and the handle at the bottom left side of the apron would be raised to pass over the first stop, after which it would automatically fall into position to encounter the second, and so on.

The lathe is a Lodge & Shipley 18 in. x 8 ft. patent head quick change gear engine lathe, with turret on the bed, which automatically revolves and is provided with power feed. The parts which this lathe is adapted to

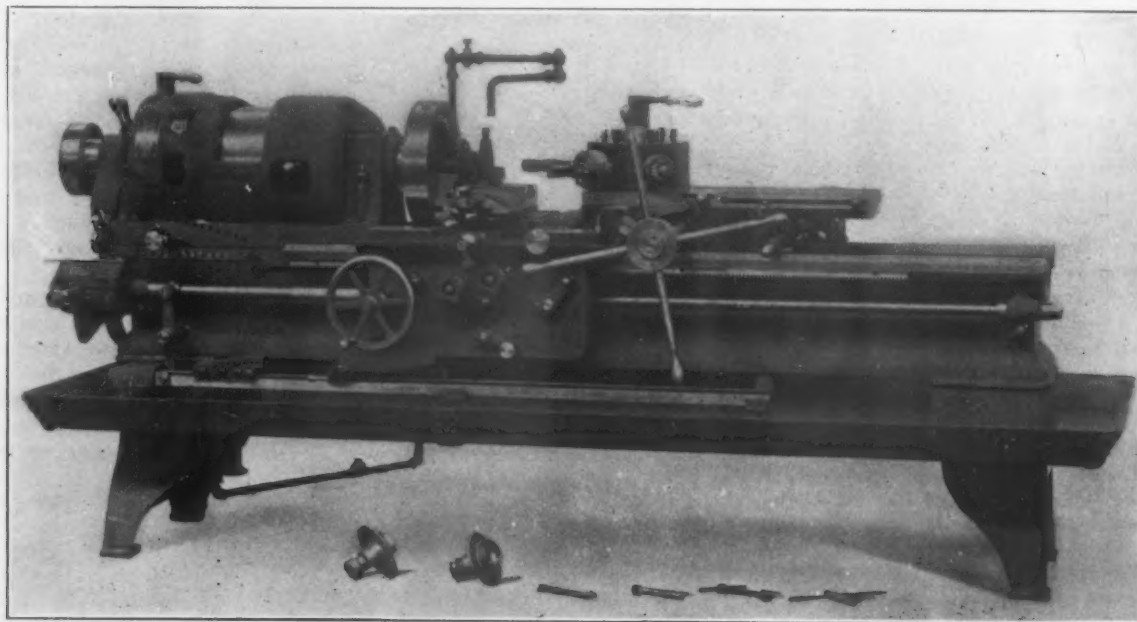


Fig. 1.—An 18-In. by 8-Ft. Patent Head, Quick Change, Gear Lathe, with Turret, Built by the Lodge & Shipley Machine Tool Company and Particularly Adapted for Turning Automobile Hubs.

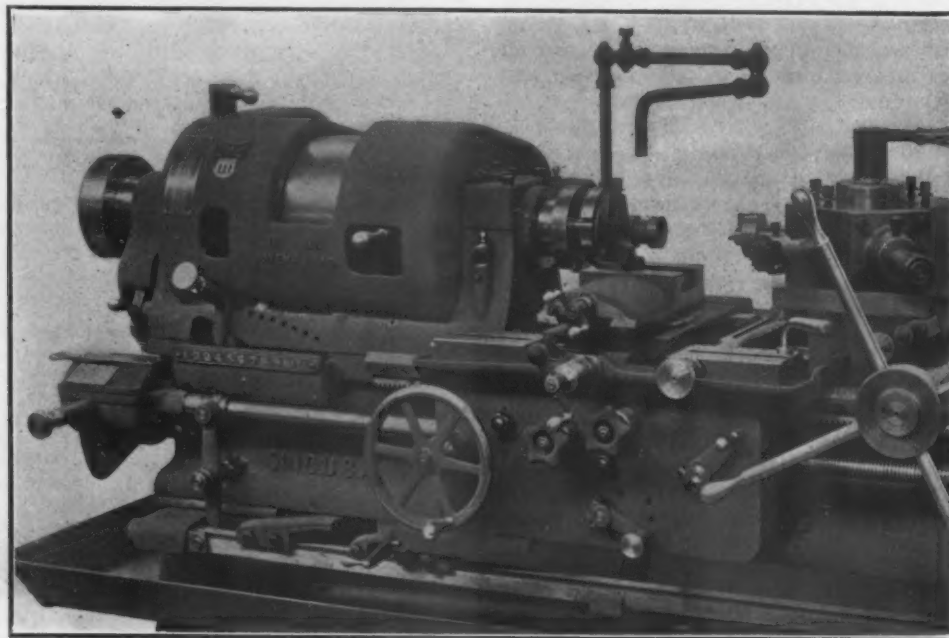


Fig. 2.—Detail of the Lathe as Equipped for the Second Set of Operations on Hubs.

several operations without resetting of work and tools. Two new features that do away with the necessity of measuring and calipering in the execution of duplicate work are the positive stops for the longitudinal feed and the diameter gauge to limit the cross travel of the compound rest, so that the tool will turn exact diameters. The adjustable stops of the longitudinal feed may be seen in both illustrations on the bar, secured to the bed under the carriage apron. The diameter stops are mounted in the slots of the rotatable barrel, shown in Fig. 2, on the carriage to the right of the compound rest. Any one may be placed in operating position by turning the knob at the front. If two or more shoulders were to be

work upon, as shown in the illustrations, are front and rear automobile hubs of malleable iron. The hubs shown on the floor in Fig. 1 are front hubs, $5\frac{1}{2}$ in. long, $5\frac{1}{2}$ in. diameter across the flange and $2\frac{1}{2}$ in. diameter on the smaller end, which is threaded. The rear hubs are similar, the main differences being that the rear hub is faced on both ends, finished more completely on the outside, and has a ball race at one end only. On this style of hub there are two sets of operations, for the first of which the lathe is provided with special reamers and boring jigs, and a 15-in. combination chuck, such as shown in Fig. 1, and for the second, drivers, special arbors for holding the hubs in their bore and

thus insuring a true piece of work, and the turret tool equipment, shown in Fig. 2, comprise the equipment.

In machining the front hub for the first operation the hub is held with the flange against the jaws of the chuck, as shown in Fig. 1. The turret operations comprise boring a straight hole through the hub with a four-lip drill, boring the seat of the ball cup and reaming this seat. While these turret operations are being carried on, the tool on the compound rest faces the end, thus completing the first operations. Holes in the flanges are drilled before the second operations.

For the second operations the front hub is mounted upon an expanding straight mandrel, carried in the hole in the lathe spindle, as illustrated in Fig. 2. The drive is from a pin, fitted into a drilled hole in the flange. The turret operations comprise boring the seat for the ball cup and reaming this seat, for which the correct depth is positively obtained. While the turret tools are at these operations, the tool in the compound rest is facing the flange. The barrel of the hub is also turned and the various diameters are positively obtained by the diameter gauge. The thread is then cut with a die, thus completing the machine work for the front hub.

The rear hub for the first operations is held with its flange against the jaws of the chuck. The turret operations are boring and reaming the seat for the ball cup and facing the seat for the dust washer. While these turret operations are in progress the compound tool faces the brake pan on the flange and turns the flange diameter; all diameters and lengths are obtained from the positive stops. Holes in the flanges are drilled before the second operations.

For the second operations the rear hub is mounted upon a straight arbor, which is located in the hole of the lathe spindle, and the hub is driven by a pin through a drilled hole in the flange. The hub is additionally supported by a bar carried in one of the turret holes, which allows faster cutting, and gives truer work. All operations are performed by the tool in the compound rest, comprising facing the end, facing the flange and turning the barrel.

Ontario's Sheet and Tin Plate Enterprise.

TORONTO, June 21, 1909.—An agreement has been reached by the Sheet Steel Corporation, Morrisburg, Ont., and the municipal corporation of that village. The Sheet Steel Corporation purchased the assets and rights of the Canada Tin Plate & Sheet Steel Company of Morrisburg, which after starting its plant encountered a number of difficulties, chiefly the lack of tariff protection and lack of working capital. The municipality of Morrisburg made large outlays to secure the industry. It obtained power rights from the Dominion government and erected a power plant involving an ultimate expense of \$80,000. The Sheet Steel Corporation, with William McComb at its head, started up the plant and is now employing 150 men. The output of the galvanizing department is sold ahead to October. New capital has been provided to the amount of \$100,000. The company has agreed with the municipality to operate for two years a four hot mill plant employing 200 men and for an additional two years a six hot mill plant employing 250 men. The village leases the power plant to the corporation for 36 years and assigns it the water rights secured from the Dominion government.

The company is also to have the right to put up electric lines on the street and to operate trolley cars for the transportation of freight between the mill and the wharf. The village is to pay the company \$30,000, while the latter undertakes to settle the claim of the power plant contractor. The village waives two-thirds of the general taxes against the mill property.

Outing of Rhode Island and Massachusetts Metal Trades.—The Rhode Island Branch of the National Metal Trades Association entertained the members of the Boston and Worcester branches at an outing on Narra-

gansett Bay Thursday, June 17. A typical Rhode Island shore dinner at Fields Point was enjoyed and later a steamer took the large party to Rocky Point, where a ball game between the Rhode Island and Massachusetts members resulted in a victory for the hosts by a substantial margin. The day was concluded by a sail around the bay in the early evening, supper being served on the boat. The officers of the Rhode Island Branch, to whom a large part of the success of the outing was due, are E. A. Beaman, Beaman & Smith Company, president; Henry D. Sharpe, Brown & Sharpe Mfg. Company, vice-president; J. G. Aldrich, New England Butt Company, treasurer; J. A. Holland, secretary; and executive committee composed of E. C. Bliss, E. C. Bliss Mfg. Company; C. E. Davis, American Locomotive Company; L. W. Downes, D. & W. Fuse Company, and H. L. Scott, Henry L. Scott & Co. The booklet containing the programme had many jests and much useful information concerning Narragansett Bay and its surroundings.

Canada's Mineral Production.

TORONTO, June 19, 1909.—The mineral production of Canada in the calendar year 1908, according to the preliminary report of the Dominion Department of Mines, was of the total value of \$87,323,849, as compared with \$86,842,765 in 1907. Of the 1908 aggregate \$41,655,936 is credited to the metallic group, the remainder being the value of the nonmetallic group. The items under the metallic head are as follows:

Copper	\$8,500,885
Gold	9,559,274
Pig iron from Canadian ore.....	1,664,302
Lead	1,920,487
Nickel	8,231,538
Cobalt	112,253
Silver	11,667,197

Iron and Steel Production and Bounties.

Besides the pig iron made from Canadian ore, as indicated above, there was an output of 531,415 tons, valued at \$6,446,892, of Canadian pig iron made from imported ore. The total shipments of iron ores from Canadian mines amounted to only 203,490 tons, valued at the mine at \$486,857, as compared with 312,496 tons, valued at \$666,941 in 1907. The greater part of the ore came from the Helen mine in Michipicoten, delivered at the Midland and Hamilton furnaces. The 16 furnaces at work in the year consumed less domestic ore than they did in 1907. Their total pig iron product in 1907 was 651,962 tons. Of last year's pig iron output 6709 tons were produced with charcoal as fuel.

Steel ingots and castings aggregating 588,763 tons, valued at \$9,233,602, were produced in 1908, as compared with 706,982 tons, valued at \$15,612,590 in 1907. The production for the two years is shown in the following table in gross tons:

	1907.	1908.
Ingots:		
Open hearth (basic).....	459,240	443,442
Bessemer	225,989	135,557
Castings:		
Open hearth (acid and basic).....	20,602	9,051
Other steels.....	1,151	713

The bounties paid on iron and steel during the two years were as follows:

	1907.	1908.
Pig iron from Canadian ore.....	\$201,421.47	\$213,458.34
Pig iron from imported ore.....	591,583.80	569,166.93
Steel ingots.....	1,099,873.37	917,876.63
Steel wire rods.....	412,417.26	297,778.68
Totals.....	\$2,305,295.90	\$1,998,283.58

The estimated silver production of the country in 1908 was 22,070,212 oz., as compared with 12,779,799 oz. in 1907. Though the quantity produced last year was 72 per cent. greater than in 1907 the money value was only 40 per cent. greater, owing to the lower prices prevailing in 1908. More than 87 per cent. of the total output came from Ontario mines.

In the nonmetallic group the minerals running into the largest aggregate value are the following: Coal, \$24,381,842; cement, \$3,781,371; asbestos, \$2,484,768.

C. A. C. J.

ARC WELDING.*

BY C. B. AUER†

Though this paper has for its title "Arc Welding," it may not be amiss to describe very briefly several other processes of electric welding, and thus give a better idea of the particular field of application for arc welding.

There are four distinct processes of electric welding, known respectively as the Thomson, the Zerener, the La Grange-Hoho and the Benardos, from the persons who either originated or had most to do with developing them.

In the Thomson, or, as it is sometimes called, the incandescent or resistance method, the metals to be welded are clamped to the terminals of an electric circuit and carefully butted together. When the circuit is completed current flows through the abutting metals, heating them to fusion, when they are automatically forced together, thus uniting perfectly. The resulting joint is always accompanied by a shoulder or fin, which, however, is easily removed, usually by a hand file, though sometimes an automatic hammer or roll is employed. The apparatus, one form of which is shown in Fig. 1, consists of a transformer, in size from 1 to 100 kw. or more, depending upon the class of work to be done. The primary of the transformer may be designed for operation at any one of the usual voltages and frequencies, the secondary being arranged to give a very large current at a very low voltage and being further provided with terminals in the shape of heavy clamps, sometimes water cooled, in which are secured the metals to be welded. Variation of output is obtained by switches or a choke coil in the primary circuit. The method just described is used for a variety of purposes, such as uniting wires, rods or bars of similar or even of dissimilar metals, making tires and cylinders, putting heads on bolt and screw bodies, joining rails, &c.

In the Zerener or electric blowpipe process an arc is sprung between two carbons and caused by an electro magnet to impinge upon the metals to be welded. The

of a pencil point instead of spreading it out as is done in the lamps. The work to be welded is so placed that the arc may be directed upon it, the blowpipe being moved by hand either toward, away from or parallel to the work, as occasion makes necessary. Owing to the general construction of the apparatus, which does not



Fig. 1.—Using the Thomson or Incandescent Electric Welding Apparatus.

metals are thus brought to a state of fusion at the point of contact with the arc. The apparatus employed, Fig. 2 (taken from Glaser's Annalen), is much like certain types of direct current flaming arc lamps, the carbons approaching each other at an angle, and further resembling them in being provided with a magnet for blowing the arc downward, shaping it, however, into more or less

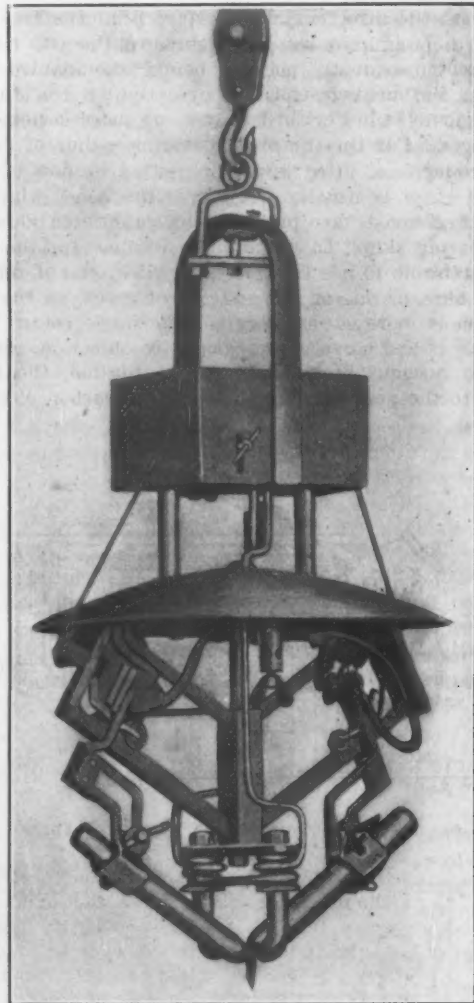


Fig. 2.—The Zerener or Electric Blowpipe Apparatus.

lend itself to the carrying of large currents, and to the difficulty in properly regulating the arc, the process is confined to a rather narrow range of small work of the rougher kind, such as the welding of small castings and wrought iron plates.

In the La Grange-Hoho process, otherwise known as the water pail forge, Fig. 3, the metals to be welded or forged are fastened to the negative terminal of an electric circuit, the positive terminal being placed in a wooden tank containing a suitable solution. Upon completing the circuit by inserting in the solution the metals to be welded or forged, they are rapidly brought to the proper temperature, when they are then withdrawn and welded together or forged to shape in the customary manner. The process is adapted to small and simple work, preferably of wrought iron, and such as can be readily manipulated by hand.

It may be mentioned in passing that all three of these processes are used for soldering as well as for welding, it being simply a matter of applying less heat.

In the Benardos or arc welding process, Fig. 4, the metal to be welded forms one terminal of a direct current circuit, a carbon electrode the other. By touching the carbon to the metal and instantly withdrawing it a certain distance an arc is sprung between the terminals. Through the medium of the arc, which has a temperature

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between 3500 and 4000 degrees C., the metal may be either entirely melted away, molded into a different shape or fused to another piece of metal as desired. A complete outfit for arc welding consists of a direct current supply with its controlling apparatus, a stock of carbon electrodes of various diameters, fireclay, or carbon blocks for molding the metal, a flux, and material for filling purposes.

Owing to the intense glare of the arc the work must be done in an inclosure in order not to interfere with other work in the immediate vicinity. The operator, too, must be thoroughly protected over the entire person. It is not sufficient, as with oxy-acetylene welding, simply to shield the eyes with a pair of colored glasses. Exposure to the direct rays of the arc produces an irritation of the skin quite similar to sunburn, the skin reddening and subsequently peeling, being accompanied by a stinging or burning sensation over the area of the exposed surface; but with, however, no more serious consequences. For this reason a covering either of canvas or stove pipe and fitted with a projecting window of thick colored glass is usually worn over the head, while the hands and wrists are protected by gauntleted gloves of buck or pig skin. In making the window for the hood it is advisable to use two pieces of glass, one of red and one of blue, or one of red and one of green, as the combination is more satisfactory than a single color. Both the canvas and stove pipe are open to objection, the former on account of the lack of ventilation, the latter owing to the possibility of touching the carbon electrode

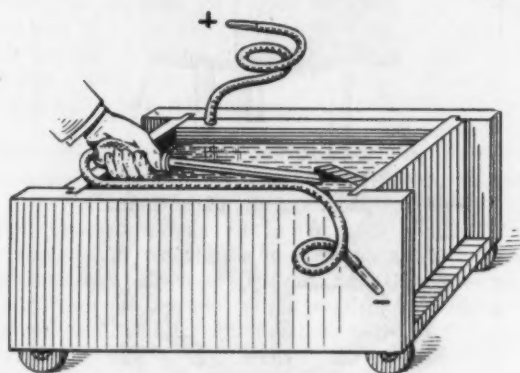


Fig. 3.—The La Grange-Hoho Water Pail Forge.

to it in a moment of carelessness and thus receiving a shock. Care should be taken to have the window of the hood project a little, as the glass will, in time, become quite hot, and if too close to the eyes will inflame them. If preferred, a wooden shield properly fitted with glass and which is held in the hand may be used; but it, too, has an objection in that it requires the constant use of one hand.

The necessary direct current may be obtained either from a 100-volt independently driven dynamo, from a similar public supply circuit, or from a battery operated in conjunction with a dynamo or other supply circuit; or current may even be obtained from a higher voltage supply, if this is the only kind available, though the last is very wasteful and can be recommended only where the work to be done is so infrequent as not to warrant one of the other methods being employed. In general, the supply should be of not less than 75 to 100 kw. The dynamo may be shunt or compound wound, preferably the latter, and if direct connected a flexible coupling should be used to prevent burning out of the armature.

The circuit for the control of the current may be arranged in either of two ways. The first of these is shown diagrammatically in Fig. 5. One leg of the circuit leads from the switchboard through a circuit breaker to the main rheostat, which consists of two water barrels. These are provided with pulleys and counterweights, by means of which the distance between the terminal plates may be varied and the resistance in the circuit increased or decreased accordingly. From the rheostat the circuit is continued to a metal table which forms the positive terminal. The metal to be welded may be laid upon this table, especially if it has a flat,

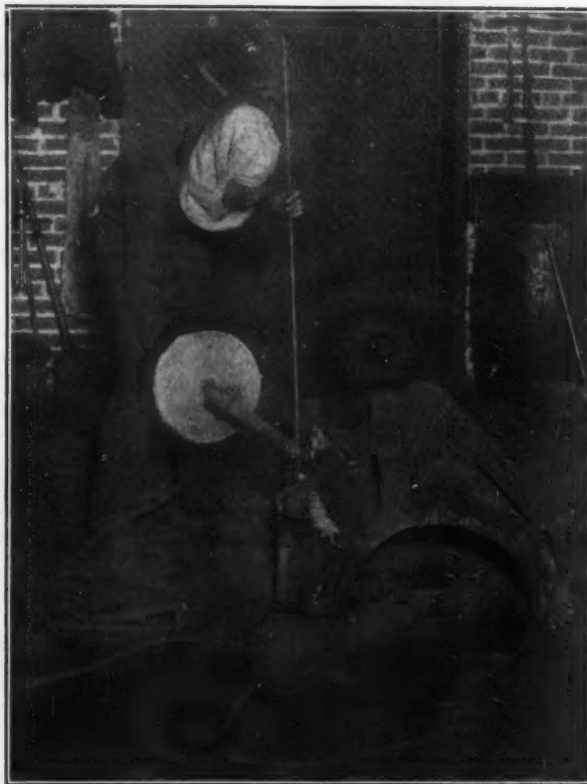


Fig. 4.—Using the Benardos or Arc Welding Apparatus.

smooth surface and is not too large; otherwise it will be found more convenient to fasten the cable from the rheostat directly to it. The other leg of the circuit leads from the switchboard through a single pole switch to the carbon electrode. While water barrels, Fig. 6, serve as rheostats fairly well, the objections to them are that when the plant is worked very hard the water will occasionally boil over, necessitating a stoppage of the work to allow the water to cool; further, the bands on the barrels rust away, thus requiring new barrels every few months. Grid rheostats are therefore frequently used instead. They are provided with several switches by which the resistance may be graduated.

A second arrangement of circuit is shown in Fig. 7. It differs from the first in having a relay which operates to cut out a part, or even the whole, of the main rheostat as soon as the circuit is completed. Where the cost of current is an appreciable factor, this is a convenient arrangement, as the loss through the main rheostat may be reduced or eliminated.

One kind of electrode, illustrated by Fig. 8, consists of an insulated metallic handle provided with a properly clamped carbon, which forms the negative terminal of

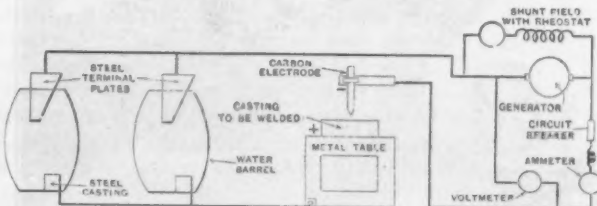


Fig. 5.—Diagram of One Manner of Connecting an Arc Welding Circuit.

the circuit. The carbon used will vary from $\frac{1}{4}$ to $1\frac{1}{2}$ in. in diameter by 6 to 12 in. long. It should be hard and solid (not cored), and in burning away should leave a rounded end instead of a pencil point. The carbon is clamped about midway simply to reduce the resistance somewhat.

In another kind of electrode a button is provided which, when pressed, brings into action two solenoids; these in turn closing the main circuit, but keeping it closed only as long as the button is pressed down by the finger. The advantage of this feature is that short cir-

cuits are guarded against in case the electrode is accidentally dropped or carelessly set down.

In preparing for a weld, Fig. 9, emphasis is laid upon the necessity of making the piece to be welded the positive terminal, so that the current will flow to instead of from the carbon electrode. Should the direction of flow be reversed, carbon will more readily enter the piece being welded, thus producing a very hard weld and one difficult, if not impossible, to machine. The plates in the water barrels are next placed at what is deemed to be the correct distance apart to give the necessary resistance; or, if grid rheostats are used, the same result is accomplished by adjusting the switches, each of which cuts into or out of the circuit a certain number of grids. The circuit breaker and the single pole switch are then closed, after which the operator places himself in position, with the carbon electrode in one hand and having within reach of the other the flux and the material to be used as filler. He next pulls the hood down over his head, touches the carbon electrode to the piece to be welded and instantly withdraws it to a distance of 2 in. or more. The arc thus produced is allowed to play upon the piece, being given a rotary motion by the hand, until



Fig. 6.—Water Barrel Rheostats and the Benardos Electrode.

the metal commences to boil. Should the arc cause trouble by frequently going out, or if, on the other hand, it prove too intense, the resistance in the circuit must be altered accordingly. The rotary motion enables a considerable area of the surface of the metal in the vicinity of the weld to be heated, thus preventing it from cooling too rapidly, with the consequent danger of cracking or producing a hard weld. When the fusing temperature is reached, the filler and the flux are put into the boiling metal, a little at a time, the arc meanwhile being continued until the weld is completed. Hammering of the weld during the process of cooling will be found advantageous as giving the metal a closer grain. It is advisable, whenever possible, to make the weld during one continuous application of the arc. Not only will the weld thus be made more quickly, but there will be no tendency for scale to form and so assist in causing a hard weld. When, however, it is necessary to make several applications of the arc, care should be taken to remove the scale by brushing with a stiff wire brush. It is equally necessary to have the metal quite clean before commencing a weld; this may be accomplished by chipping, or the piece may be tilted and the arc applied until the dirt or slag has melted and run off by gravity.

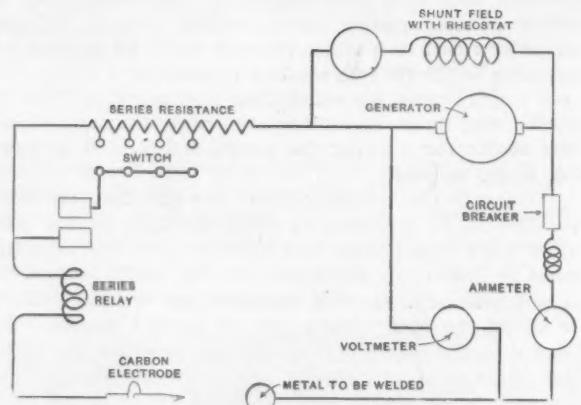


Fig. 7.—Diagram of Another Manner of Connecting an Arc Welding Circuit.

In the welding of wrought iron or steel, the filling material may be soft iron rod, punched iron scrap or broken bits of steel castings. A very good flux consists of a mixture of 15 to 25 per cent. of red oxide of iron (Fe_2O_3) and 85 to 75 per cent. of borax ($\text{Na}_2\text{B}_4\text{O}_7 + 5\text{H}_2\text{O}$). Any carbon which may have been introduced into the weld unites with the oxygen in the flux to form CO_2 gas, leaving behind soft iron. Should, however, this CO_2 gas not be wholly removed, it will cause sponginess in the metal. The borax simply assists in preventing oxidation by spreading over the weld and keeping out the air. When building on a lug, a mold is made of fireclay or carbon blocks in order to give the metal the desired shape. Fig. 10 shows a cast steel bearing cap, before and after being provided with a lug and the way in which the mold is prepared.

In welding cast or malleable iron, the metal must be slowly preheated to a cherry red, the weld being made while in this condition, and the piece then allowed to cool equally slowly. The same flux as for wrought iron or steel, and filling material of soft iron rod, punched iron, copper or special cast iron may be used. For small work it is preferable to have a gas furnace, opening from the top, and if possible to make the weld without removing the casting from the furnace. For large work a temporary furnace may be built entirely around the casting, ports being provided which at the proper time can be uncovered and through which the carbon electrodes can be inserted and the welding done.

When welding a brass or zinc casting, the piece must be supported in such manner that it will not lose its shape, and borax should be used as a flux to reduce oxidation.

Welds made in iron or steel by the electric arc are sometimes found to be extremely hard. Where there is no machining to be done this feature is of little moment, and occasionally may even prove of advantage. Where, however, machining is required a hard weld is a serious matter, and, while annealing may be resorted to, remaking the weld will usually be found preferable. It may be taken for granted that when a hard weld is encountered it is due to failure to observe one or more of the several precautions already outlined.

It is interesting to compare the strength of fire welded with arc welded iron and steel bars. In a paper by Samuel MacCarthy on "Steel Plates, Pipes and Fittings, and Benardos Arc Welding in Connection Therewith," read before the Institution of Mechanical Engineers, England, the results of a series of tests were given which are reproduced in Table 1. The bars were all scarf welded,

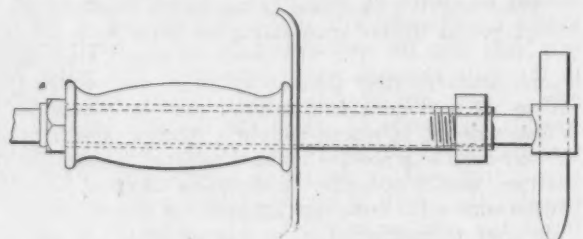


Fig. 8.—Detail of the Benardos Electrode for Arc Welding.

Table 1.—Main Results of Tests of Fire-Welded Compared with Electric-Welded Bars.

Brand and size. F = Fire-Welded. E = Electric-Welded. Brand.	Inches.		Ultimate tensile strength per square inch. T		Contraction of area at fracture. C		Extension in 10 in. Per cent.		Ratio of weld to solid. Per cent.		Figure of merit, T × C	
			Tons.		Per cent.		Per cent.		Per cent.		T × C	
Lowmoor iron.....	2 x 3/16	F	20.3	21.1	15.2	17.3	7.3	7.3	77.9	81.1	308	365
		E	21.5	21.8	22.3	20.7	11.3	9.7	90.7	91.8	479	451
Lowmoor iron.....	2 x 3/16	F	18.4	20.1	10.1	10.8	3.4	4.5	84.4	92.0	185	217
Netherton best iron.....	2 x 1/4	F	20.9	22.3	9.3	18.4	1.9	3.8	69.1	73.6	194	410
		E	20.4	21.0	15.9	15.4	8.1	7.3	82.3	86.4	324	323
Parkgate steel.....	2 x 1/2	F	...	...	...	...	...	...	...	...	1,490	1,766
Parkgate steel.....	2 x 1/2	E	...	...	...	...	...	...	...	...	...	...

Average of electric-welded bars = 1,766
Average of fire-welded bars = 1,490 = 118.5 per cent.

the scarf ranging from 1 1/4 to 1 1/2 in. It will be seen that there is a difference of about 18 1/2 per cent. in favor of the arc welded bars, and it is of further interest to observe that the strengths of the welds range from 73.6 to 92 per cent. of that of the original material.

Besides the welding of metals the Benardos or arc welding process may sometimes be employed with advantage along quite different lines, as, for example, in cutting away surplus metal, also in removing sink heads from castings, Fig. 11; or for boring holes in wrought iron and steel plates, Fig. 12; for flanging pipes, for opening the tap hole in furnaces, &c. In Fig. 13 is shown a casting which was received from the foundry without the strut supporting the bearing bracket. This was supplied by welding on a heavy wrought iron support.

To give exact data as to the time required for making welds, the current consumption, size of welds, &c., is from the nature of the work almost impossible. Tables 2, 3 and 4 will, however, afford some idea of these items and are given as approximations only.

Table 2.—Benardos Process, Filling Drilled Hole in Axle Cap.

Line volts.	Amperes.	Volts across rheostat.	Volts across arc including carbon.
126 (open circuit).....	...	...	...
102.....	550	38	63
102.....	500	36	65
102.....	550	39	61
98.....	600	42	53
97.....	650	44	51
97.....	650	45	50
102.....	600	42	58

Size of hole = 1 1/4 in. in diameter by 2 in. deep. Size of carbon = 1 1/2 x 6 in. Time = 56 sec.

Table 3.—Benardos Process, Removing Sink Head from Axle Cap.

Line volts.	Amperes.	Volts across rheostat.	Volts across arc including carbon.
120 (open circuit).....	...	...	...
95.....	600	34	62
98.....	650	30	67
100.....	600	31	67
95.....	850 (kick)	30	64
100.....	850	30	71
100.....	850 (kick)	35	63

Cross section of sink head = 2 1/2 x 6 in. Size of carbon = 1 1/4 x 6 in. Time = 4 min. 45 sec.

Table 4.—Benardos Process, Burring Hole in Wrought Iron Plate.

Line volts.	Amperes.	Volts across rheostat.	Volts across arc including carbon.
120 (open circuit).....	...	...	...
98.....	430	23	72
102.....	400	22	81
104.....	370	20	86
85.....	1,000 (kick)	24	60
87.....	1,000 (kick)	35	63

Size of hole = 1 1/4 in. in diameter by 1 1/2 in. deep. Size of carbon = 1 1/2 x 6 in. Time = 3 min. 30 sec. (includes 45 sec. for reversing plate).

The query has doubtless arisen in the minds of many among you as to how arc welding compares with the oxy-acetylene process. The two processes would seem to be complementary rather than antagonistic, arc welding having as its particular field heavier and, if it may be so called without misinterpretation, rougher work, while the oxy-acetylene process is more adapted to small work, castings, shafts and sheet metals, including the cutting of thin sheets, the close regulation of the flame permitting a delicacy of manipulation impossible with the arc.

Discussion.

C. PIRTLE: A motor generator set giving a low voltage source of supply should by all means be used. As a rule 220 or 110 volts are used, which is very inefficient, and not enough current is available at 220 or 110 volts from the ordinary industrial plant to do good work. Nothing to my mind has kept arc welding back so much as trying to operate with too little current. Mr. Auel's tables show from 350 to 400 up to 1000 amperes, and this is the range of current necessary to meet all conditions. Very little welding work can be done with a machine that will not give 600 amperes with safety.

Arc welders are being used mostly in steel foundries, but several are used in other plants and for work which is unusual. For instance, one user is making the side seam and putting heads into hot water boilers and low pressure steam boilers. He is putting these on the market and guaranteeing them. There was one case of cutting material by the electric arc, in which about 30 slag pots had been made, which would not clear the ground by about 1/2 in. It was found to be partly due to a mistake in the drawing and partly to the sag of the mold, which made the bottom of the pot too thick. The casting weighed in the neighborhood of 20,000 lb., and about 1 1/2 in. were taken off the bottom in a short time and in a very efficient way with the arc. The carbon used was 2 1/2 in. in diameter and the current about 1200 amperes.

The arc for cutting structural material was used to break up the Ferris wheel. When the props were blown out from under it with dynamite it was supposed to fall over on its side. Instead, the big main axle came straight down, and since the tension members were round wrought iron they simply doubled up like a collapsed bicycle



Fig. 9.—Manner of Welding with the Benardos Electrode.



Fig. 10.—A Steel Casting Requiring a Lug; the Same Prepared for Welding and After Welding.

wheel and it was a bad tangle. With an arc welder short work was made of the wheel, though there were a good many tons of iron in it.

G. H. Wood: Many engineers are familiar with the usual methods employed in opening the tap hole of blast furnaces after the iron has become chilled. At the Carrie Furnaces use is made of a simple but effective application

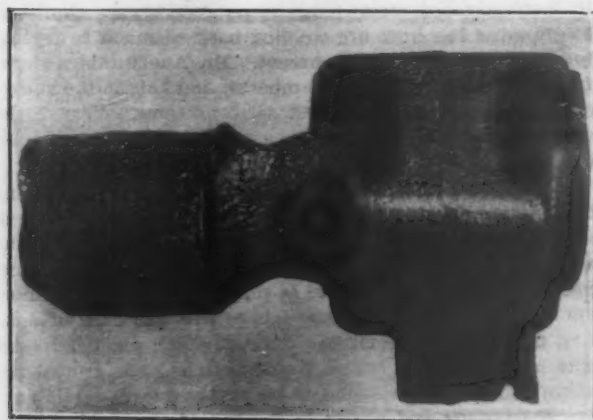


Fig. 11.—A Steel Casting with a Sink Head that Was Removed with the Electric Arc.

of the electric arc. Although not original with us, we have used this method for several years. A double pole, single throw knife switch is permanently located at each furnace, with the positive terminal clamped firmly to the structural part of the furnace and the negative terminal connected, through a small bank of grid resistance submerged in a barrel of water, to the burner, which consists of a carbon 2 in. in diameter by 48 in. long, supported by a short length of 2-in. pipe with a wooden handle. When assembled, the burner is about 10 ft. long, thus bringing the operator at such a distance from his work that he can see plainly, and also be able to get away should there be a sudden rush of metal. The operator is provided with a bag hood supported from the shoulders, ventilated at top and bottom, and fitted with red and blue glasses for the protection of the eyes and face.

Being thus equipped, the operator draws an arc on the chilled iron in the tap hole, using a line potential of 250 volts and a direct current of 800 amperes. With a

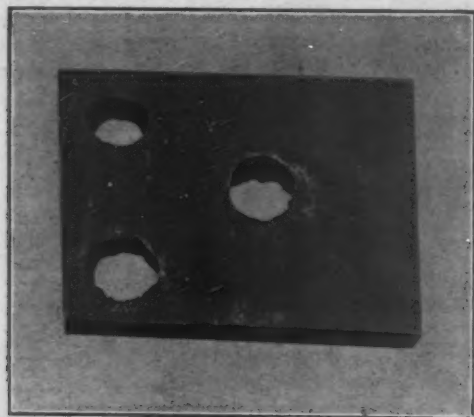


Fig. 12.—A Steel Plate with Holes Pierced by the Electric Arc.

2-in. arc and the above conditions of voltage and current, the burning will proceed at the rate of 30 in. per hour. After the furnacemen have exhausted all other mechanical means it is possible to free iron within 45 min. by using the burner.

We find that the burner can be used to advantage for many other kinds of work around the furnaces. Sometimes, after a furnace has had a bottom slip, some of the tuyeres are filled with chilled iron and cinder. The burner is then put at work, and the tuyere is soon opened. Care has to be taken lest the side of the tuyere is burned in the operation. Oftentimes cinder is encountered, and since it is a nonconductor the arc is broken. To get through the cinder a sharp iron bar is driven till it strikes the iron and then blocked off to one side to allow the burner to pass, so as to burn off the bar as far in as possible. Then the burning continues along the iron point imbedded in the cinder until the iron itself is reached.

In burning out tuyeres care has to be exercised when the chilled iron is burned through, as the hot blast, which is coming in through the other tuyeres, will blow hot metal and cinder out on the operator. To avoid such an occurrence, the burning is stopped as soon as the iron becomes soft. Then the hot blast is put on and the tuyere is soon freed of any iron that may be left in it.

In tearing down the bosh of a furnace, preparatory to

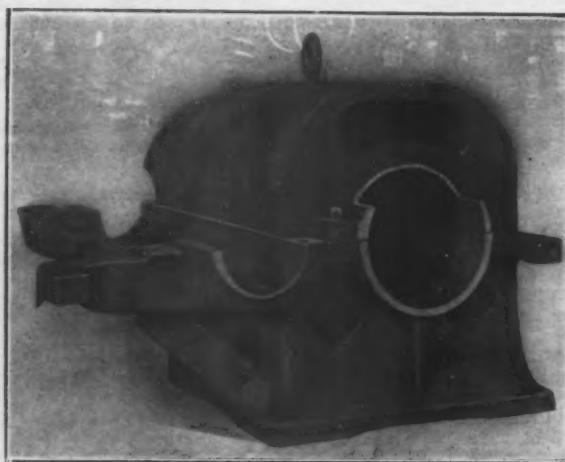


Fig. 13.—A Casting on Which a Bracket Support Was Welded.

relining, we use the burner to burn off the bosh rings, thereby saving time and expense.

Oftentimes the removal of the salamander is the cause of much delay. If it is too hard to be drilled by rock drills, we use a burner. The brick work is cleared away from around it, and the burning is done from the side with an inward and slightly upward direction, so that the fused iron can run out. To do this, the burner is shortened so that the operator may get in beside the salamander.

We had trouble with the clamping I-beam on a car tippie. It was too long and bent the handles on the cars as it clamped them ready to be dumped. This was an extra heavy 24-in. I-beam, and we burned the end off in 12 min.

Recently a spur from the railroad track was needed to enter the side of a new extension to the power house. This site was surrounded with sheet piling which pro-

jected above the ground. We put a burner at work, and at the rate of 4 min. per 12-in. pile soon cleared a space for the track.

Although with a 250-volt circuit we are able to get any length of arc up to a 10-in., we find that we obtain the best results with about a 2-in. arc and a current of 800 amperes, using a low resistance of probably 0.16 ohm.

Two New Watson-Stillman Hydraulic Jacks.

Those having much heavy lifting to do appreciate the inconvenience of carrying a jack from one place to another, especially when it weighs more than a hundred pounds. A jack is rather heavy to carry by hand, and if it is loaded on a truck and unloaded with each using, considerable work is involved. To do away with much of this labor the Watson-Stillman Company, New York City, has designed the hydraulic shop jack, shown in Fig. 1. The wheels on the base and the handle on the cylinder facilitate moving the jack quickly from place to place without much exertion. The wheels touch the floor only when the jack is tilted, hence do not interfere with its stability during the lifting operation. If it is desired to use the jack at an angle, it can be tilted in the opposite direction to the wheels, and when it is laid flat upon the side, the ram will push out its entire lifting length. The head is enlarged sufficiently so that the jack will not stop working for lack of filling, even if



Fig. 1.—A Hydraulic Jack with Wheels.



Fig. 2.—A Hydraulic Jack with Independent Pump, Made by the Watson-Stillman Company, New York.

there has been slight leakage. An independent steel claw, which is not shown in the illustration, can be used when desired for lifting from near the ground. This is more convenient than a permanently attached claw, as the independent part is easily applied when a low lift is required, and its removal at other times makes the jack considerably lighter. The weight, however, is comparatively small, because the whole jack is made from steel, and the parts under greatest strain, such as the ram and cylinder, are machined from a solid bar of steel which is stated to be higher in carbon than that usually found in hydraulic or other jacks. The jack is made in 11 sizes, from 20 to 50 tons capacity, and lifts of 12 and 18 in.

The independent pump hydraulic jack shown in Fig. 2 was devised to overcome the difficulty of working the lever of a jack of the internal pump type because of lack of room or insufficient footing, and for places where only a short space is available to place the jack, as is often the case in bridge, ship and dry dock work, &c. Even in more common work it is sometimes of advantage, by affording a better footing, more power or safer distance for the operator from the jack. This jack is furnished in 53 sizes of from 2 to 1200 tons capacity, and the various sizes of the jack proper have maximum ram movements of from 4 to 8 in. The pump is connected to the jack by means of a flexible copper tube, which may be of any length suitable to the work in question. The jack may be operated up to a pressure of 450 lb. per square inch on the ram by the hand lever, shown on the pump, and further worked to full capacity by means of the extension lever. The gauge may read in pounds per square inch, or in tons load upon the jack, or both. This is not furnished when the jack is to be used for ordinary lifting, but is necessary in testing. When equipped with the gauge the jack may be used between two fixed platens for making compression tests, testing the tightness of forced fits, &c. Both of the above jacks are declared to be able to stand a considerable overload without danger of injury to the operator or the jack.

Athenia Steel & Wire Company.

The Athenia Steel & Wire Company, Athenia, N. J., which was started in the summer of 1907, and which built a modern rolling mill for the production of high quality flat steel, both cold rolled and tempered, as well as tempered, polished and colored spring steels, had its plant in continuous operation throughout the depression. Owing to the large demand for its products the plant was recently extended by the erection of a new tempering building and a new cleaning house. It is now operating to its daily capacity, and has part of the plant running nights. Felix Wilckes is president; August Fornellus, vice-president and superintendent; Ferdinand Wilckes, treasurer, and E. M. Bath, sales manager. The Messrs. Wilckes are well known to the steel trade on account of their long connection with the J. Wilckes Company, 135 William street, New York, which, besides acting as sales agent for the Athenia Steel & Wire Company, is agent for the Sandviken Steel Works, Sandviken, Sweden, whose band saw, hack saw and razor steels are well known in this country. Mr. Fornellus has had 30 years' practical experience in the steel business and is thoroughly conversant with all modern methods for turning out the best quality of steel. Mr. Bath is well known in the trade on account of his being previously connected with the Crucible Steel Company of America.

The Dodge Mfg. Company, Mishawaka, Ind., has added a 280-ft. extension to its main shop building, the total dimensions of which are now 122 x 585 ft. The central bay is served by two electric traveling cranes of 25 and 10 tons capacity, respectively, with travel from one end to the other. The fact that this enlargement of capacity is not so much in anticipation of future business as a necessity for the proper handling of current orders is a favorable comment upon the rapid industrial improvement now taking place.

The Small Bessemer Converter.

Its Use in the Manufacture of Steel Castings in Belgium.

BY P. EYERMANN.

A number of articles have appeared in *The Iron Age* on the manufacture of steel castings showing the advantage of employing the small converter for the production of steel. It may be of interest, therefore, to give some details of an improved system introduced successfully in the past year in some of the best known foundries of Europe. The method of employing the small converter, as described below, was devised by T. Unkenbolt of Liège, Belgium.

An important advantage of the small converter, as is well known, is its adaptability to use in connection with the ordinary cupola of a gray iron foundry. Formerly

it. The crucible furnace may give the best quality, but the fuel costs run up considerably. The small open hearth furnace will be cheaper to operate, but it can be considered only for continuous operation. The electrical furnace is only available where current can be obtained very cheaply. The converter, while it gives a higher percentage of metal loss, seems on the whole to be most advantageous. It is the one furnace for which attendance is simple and inexpensive. The foreman will have little difficulty in following the rules of the chemist, and no special skilled labor is necessary. Referring to the arrangement shown in Fig. 1, it is the usual practice to use the jib crane for filling the converter from the cupola, while the overhead traveling crane is used for

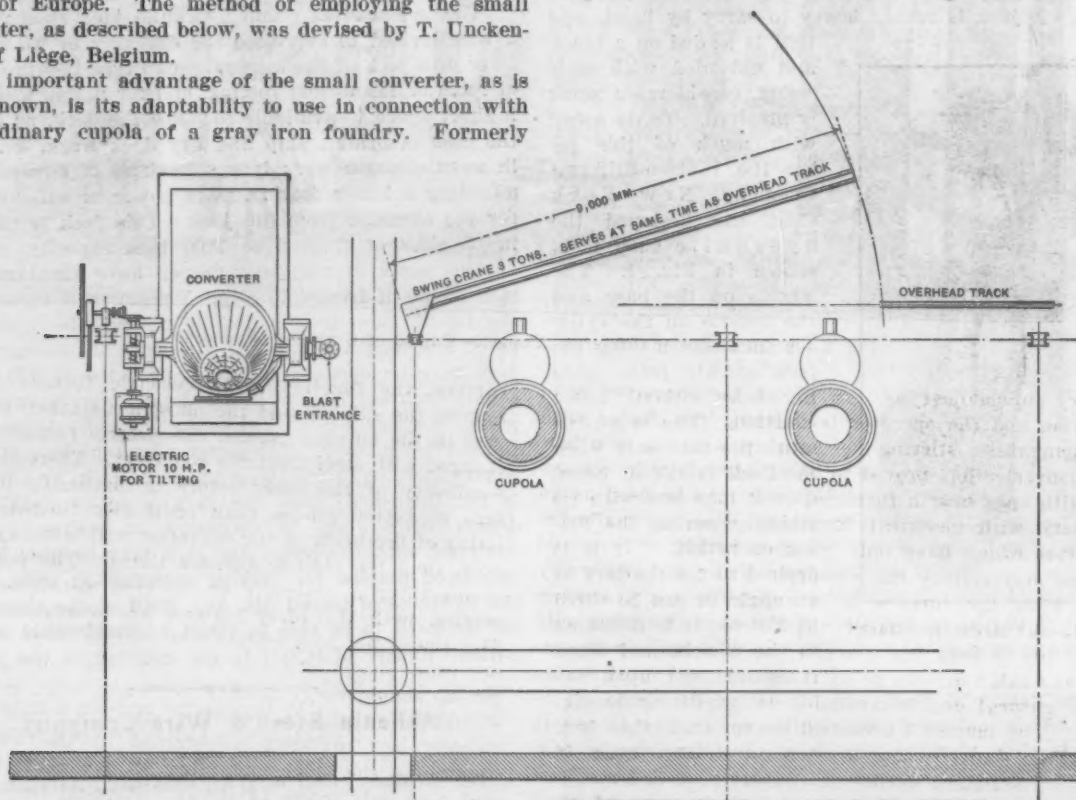


Fig. 1.—Plan of a Combined Converter and Cupola Plant for a Steel Foundry.

the foundry manager's position was not so exacting as it is to-day, but the buyer is becoming more and more particular in his specifications and the gray iron foundry is compelled to compete with higher grade products than formerly. The result is that the iron founder can expect profit to-day only when he understands how to meet the exacting requirements of his customers. The time was when the mixing of iron was kept secret by the management because of the fear that the prestige of the concern would be endangered if the mysterious formula passed into the hands of others. The chemist has done much to remove this illusion. For obtaining the best quality of castings some founders mix the metals after they are in a molten condition, and this method of mixing fluid irons, bringing together gray iron with molten steel, furnishes castings of superior strength. The steel may be melted in a crucible, in a small open hearth furnace, electrical furnace, or in a small converter. The last named is comparatively cheap in installation and requires small space.

Fig. 1 is a plan view of a combined cupola and converter plant, the whole being easily served by one jib crane. Fig. 2 is a sectional elevation of such an installation. The power required for tilting the converter consists only of a 10-hp. motor, while the blast is furnished by the motor driving the cupola blowers. It may be said that for several reasons a machine shop which makes its own castings should have an auxiliary Bessemer steel foundry. Many cases can be mentioned in which contracts for engines have been overdue for weeks simply because some small steel castings could not be secured. The small converter solves the engine builder's problem, giving him any desired quality of castings promptly and generally more cheaply than he could buy

pouring the steel into the mold. A cold saw should be provided for cutting off gates and sink heads, and for the removal of any slight defects on the surface of the casting an electrical or any modern autogenous welding apparatus may be used. A reheating furnace is a necessity for most grades of steel castings, and annealing furnaces may be required for some classes of work also.

Fig. 3 shows a converter of 3500 lb. capacity with the

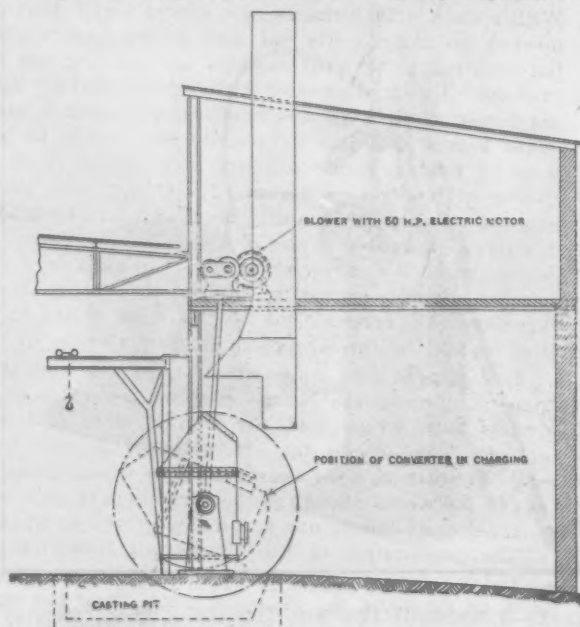


Fig. 2.—Sectional Elevation.

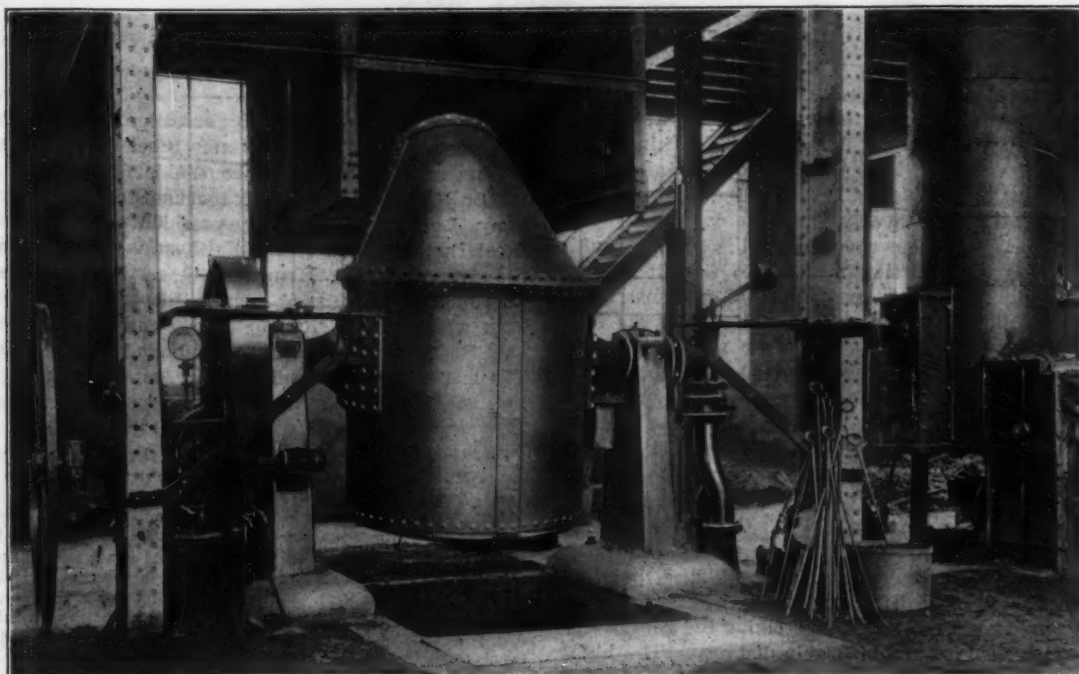


Fig. 3.—Small Bessemer Converter Alongside Cupola of Gray Iron Foundry.

foundry cupola near by. In Fig. 4 the converter is in operation and the operator is finishing the charge with ferromanganese, stirring the bath up with an iron bar. This converter has proved to be of advantage in connection with open hearth furnaces, or it may be used as an auxiliary with electrical furnaces. Steel or malleable foundries which have only an open hearth or one coal furnace may employ the converter either for emergency cases when the furnace is in repair or for producing special mixtures in smaller quantities. It requires only 2 to 3 hr. to heat the converter to a suitable temperature, and this time can be shortened in the United States where natural gas is available or where crude oil is cheap. The largest Unckenbolt converter now in use is of 5000 lb. capacity, but a 1-ton converter may be considered a standard outfit. A converter of this size can finish two charges in an hour and 20 tons of steel castings could be produced in a 10-hr. shift if required. One lining can stand from 50 to 100 heats, the life varying with the quality of fire brick lining and with the chemical compositions of the steel. A general overhauling requires about three days. Therefore, if castings should be required in large quantities it is advisable to install two converters.

The converter is of assistance also in steel foundries where the output varies greatly in chemical composition. With open hearth furnaces of a capacity of 5 tons and upward an order could not well be handled where 1 ton required to be hard castings and another ton soft castings. A desired product might be obtained by finishing partly in the ladle and partly in the furnace, but it might happen that just the pieces which should be hard were by mistake made soft and *vice versa*. With the converter, however, mistakes of this sort are usually avoided, as only the quantity necessary for one kind of casting is charged into the converter at one time. The advantage of the converter would be marked in a steel foundry already employing two or three open hearth furnaces. An arrangement of this kind exists at the steel foundry of the Krupps in Buckau, Germany.

In casting a good many small pieces with thin walls from an open hearth charge weighing several tons the steel is liable to get cold, the castings show cold shuts and the ladle freezes up. Moreover, it is only worth while to start an open hearth furnace when orders are booked for weeks ahead, as the furnace pays only when operated continuously day and night, as well as Sundays.

The combination of the Unckenbolt converter with an electric furnace promises to give exceptionally good steel, as for tools, &c. Tapping metal from the cupola into the electric furnace permits of a great saving in

current, the function of the electric furnace being to remove the sulphur and the phosphorus taken up by the iron in the cupola. Again, the electric furnace may be charged with steel from the converter. There is also the possibility of the manufacture of malleable iron castings of better grades than ordinarily furnished. The lining of fire brick in the converter will last longer, however, than the electric furnace lining. The possibilities of installing a converter of the type mentioned in connection with the blast furnace are worth considering. The liquid pig iron should not contain more than 0.06 per cent. phosphorus and 0.04 per cent. sulphur. Manganese should range from 1 to 15 per cent., and silicon should be as high as possible, say, 3 per cent. Exceptionally soft material is obtained by the addition of aluminum, the steel containing 0.1 per cent. of carbon and with only traces of silicon. Physical tests of small converter castings show tensile strength of 60,000 lb. and 25 to 30 per cent. elongation for the softer grades, about 70,000 lb. and 20 per cent. elongation for medium and up to 100,000 tensile strength, with 12 per cent. elongation for hard castings.

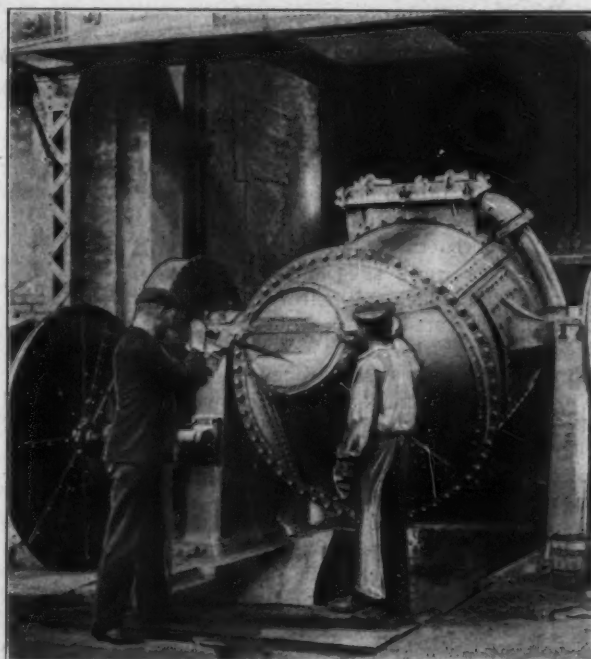


Fig. 4.—Converter in Operation—Stirring Bath After Ferromanganese Addition.

An Alliance Magnet Gantry Yard Crane.

The magnet cantilever gantry crane illustrated covers the iron yard of the Worth Bros. Company at Coatesville, Pa., and was built by the Alliance Machine Company, Alliance, Ohio. The yard is located along the right of way of the Philadelphia & Reading Railroad, and when completed will be nearly $\frac{1}{2}$ mile long.

The crane is of 10 tons capacity, and is equipped with an easily detachable lifting magnet, so that it can be used for ordinary lifting purposes. It is constructed with two cantilever ends, and arranged so that the trolley and its load can pass between the supporting legs. One end has a 25-ft. cantilever extension reaching over and commanding two lines of track alongside of the railroad right of way, on the opposite end is a 15-ft. cantilever extension to reach over one line of track at this end. The span or distance between the rails on which the gantry travels is 60 ft., thus making a total width of space covered by the crane of 100 ft.; the width between the gantry legs is so fixed that the largest size charging box can be carried through them at the highest point to which the trolley could lift the box and still leave ample clearance to prevent the box from striking the gantry legs if the box swayed any considerable distance. The height from the top of the rail to the under side of the bridge

A Dinner to Distinguished Foreign Steel Makers.

Judge Elbert H. Gary, chairman of the Financial Committee of the United States Steel Corporation, gave a dinner on June 19, at the Waldorf-Astoria, in honor of Sir Robert Hadfield, Hadfield's Steel Foundry Company, Ltd., of Sheffield, ex-president of the Iron and Steel Institute, and of Dr. Freiherr von Bodenhausen of the firm of Fried. Krupp A. G. of Essen-an-der-Ruhr, who has since returned home. Sir Robert Hadfield has been a frequent visitor to this country, while Freiherr von Bodenhausen has just completed his second visit. The guests included leading representatives of nearly all the great steel making corporations in this country. They were:

Edward Bailey, president of the Central Iron & Steel Company, Harrisburg, Pa.; E. J. Buffington, president of the Illinois Steel Company, Chicago; J. G. Butler, Jr., president of the Bessemer Pig Iron Association, Youngstown, Ohio; J. A. Campbell, president of the Youngstown Sheet & Tube Company, Youngstown, Ohio; E. A. S. Clarke, president of the Lackawanna Steel Company, New York; E. S. Cook, president of the Warwick Iron & Steel Company, Pottstown, Pa.; G. G. Crawford, president of the Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.; W. B. Dickson, first vice-president of the United States Steel Corporation, New York; A. C. Dinkey, president of the Carnegie Steel Company, Pittsburgh, Pa.; J. A. Farrell, presi-



A 10-Ton Cantilever Gantry Yard Crane with Lifting Magnet, Built by the Alliance Machine Company, Alliance, Ohio.

is 25 ft., affording ample height for storing material, and also clearing the highest box cars with a man standing on top. The bridge wheels were especially designed to permit a railroad switch to cross the rails on which the gantry travels.

All gears are of steel and have cut teeth, except the drum gears, which are shrouded. All revolving shaft bearings are bored and provided with split bronze bushings and tongued and grooved caps. No babbit is used. Through bolts are used throughout, studs being entirely eliminated. The track wheels are keyed to the axles and their axles run in hexagon bearings of the M. C. B. type. All shafts, bearings and gearing are entirely accessible, and any part can be removed without disturbing the other part. The hoisting speed of the crane is 50 ft. per minute, the bridge travel 400 ft. per minute and the cross travel 150 ft. per minute. The bridge driving motor is mounted at the center of the bridge girders and power is conveyed to the track wheels by heavy cross and vertical shafts, as shown in the engraving. The electric equipment is constructed for 220-volt direct current, and the current is carried to the crane by bare wires supported on arms projecting out from ordinary telegraph poles.

dent of the United States Steel Products Export Company, New York; E. C. Felton, president of the Pennsylvania Steel Company, Steelton, Pa.; A. F. Huston, president of the Lukens Iron & Steel Company, Coatesville, Pa.; O. W. Hutchinson, president of the Grand Crossing Tack Company, Grand Crossing, Ill.; Archibald Johnston, president of the Bethlehem Steel Company, South Bethlehem, Pa.; D. G. Kerr, second vice-president of the United States Steel Corporation, New York; Willis L. King, vice-president of the Jones & Laughlin Steel Company, Pittsburgh, Pa.; Charles Kirchhoff, editor of *The Iron Age*, New York; G. G. McMurtry, chairman of the American Sheet & Tin Plate Company, Pittsburgh; W. P. Palmer, president of the American Steel & Wire Company, Cleveland, Ohio; E. W. Fargny, president of the American Sheet & Tin Plate Company, Pittsburgh; John A. Penton, editor of the *Iron Trade Review*, Cleveland, Ohio; George W. Perkins, member of the Finance Committee, United States Steel Corporation, New York; Veryl Preston, president of the Eastern Steel Company, New York; J. H. Reed, president of the Bessemer & Lake Erie Railroad Company, Pittsburgh; David Reeves, president of the Phoenix Iron Company, Philadelphia; Wallace Rowe, president of the Pittsburgh Steel Company, Pittsburgh; W. B. Schiller, president of the National Tube Company, Pittsburgh; J. M. Scott, president of the La Belle Iron Works, Steubenville, Ohio; F. S. Witherbee, Witherbee, Sherman & Co., Port Henry, N. Y.; W. P. Worth, president of the Worth Brothers Company, Coatesville, Pa.; F. W. Wood, president of the Maryland Steel Company, Sparrows Point, Md., and August Ziesing, president of the American Bridge Company, Pittsburgh.

The invited guests who could not attend were Charles

M. Schwab, chairman of the Bethlehem Steel Corporation; Thomas Lynch, president of the H. C. Frick Coke Company; Samuel Mather of Cleveland; Ferdinand W. Roebing of John A. Roebing's Sons Company; W. A. Rogers, president of the Buffalo & Susquehanna Iron Company; W. P. Snyder, president of the Shenango Furnace Company; Powell Stackhouse, president of the Cambria Steel Company, and J. A. Topping, president of the Republic Iron & Steel Company.

A Milling Attachment for Acme Machines.

A simple and compact time saving device for finishing duplicate parts requiring slabbing, milling or slotting across the piece, has been recently designed by the

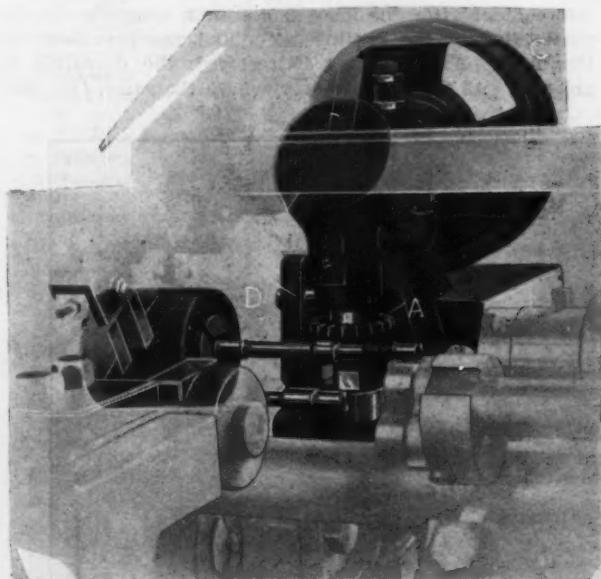


Fig. 1.—Front View.

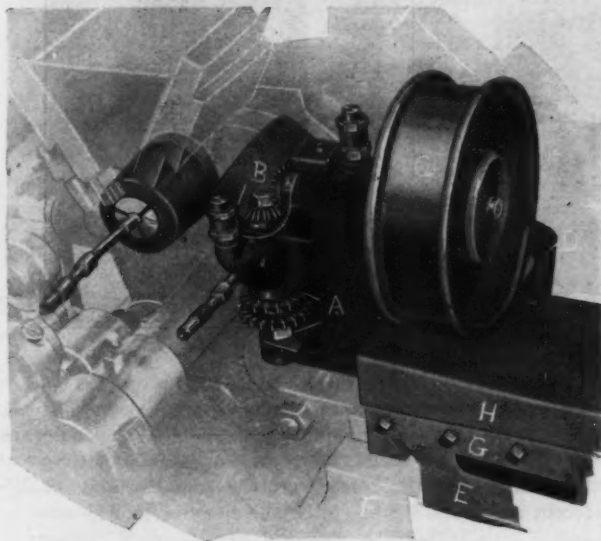


Fig. 2.—Side View.

A Milling Attachment for Use on the Acme Multiple Spindle Automatic Screw Machine.

National Acme Mfg. Company, Cleveland, Ohio, for use on the Acme automatic multiple spindle screw machine. The attachment, as shown in Figs. 1 and 2, is fastened to the top of the tool slide carrying the cutting off tool and

operates on the piece in the third position while the thread is being cut. Two milling cutters, A, are set at a given distance apart on a vertical arbor driven by the bevel gears B from a shaft carrying the pulley C, which receives its power through a belt from a Simpul countershaft. The feed of the cutters is controlled by the cutting-off cam, its throw being increased by an auxiliary lever D, Fig. 1.

The operation takes place during the time required for the forming and box milling operations in the first position and while the stock is being held stationary in the third position for the threading operation. (For this reason this attachment is adaptable only to Acme machines.) As may readily be seen, the block E rests on the cutting-off slide F, and the slide G is adjustable to locate the cut. The fixture H is dovetailed into the slide G and is fed forward by the lever D.

In attaching this device to a regular machine it is only necessary to drill and tap two holes in the top of the cutting-off slide F. This attachment was put on a No. 53 Acme automatic (a 1-in. machine) for the purpose of slabbing the piece shown in Fig. 3 for the Cadillac Motor Car Company, Detroit, Mich. This piece is being made in the Cadillac factory from cold rolled steel at a rate of 53 pieces per hour, this being as many as could be obtained without the slabbing. The previous method of making these pieces produced less than one-third as many per hour without the slabbing, which was handled as a second operation. The entire cost of rehandling for this operation is saved by the use of this attachment.

This is one of a number of attachments recently designed for this machine to eliminate rehandling duplicate parts by drilling, milling, slotting, slabbing and countersinking parts on the machine, which previously required second operations. It is possible to drive these attachments without the special countershaft by directly connecting them to the die spindle gears in the main tool slide through a telescoping shaft, knuckle joints and bevel gears. This makes it possible to drive the machine with a single belt or motor without any special overhead arrangement for the attachment.

The Tabor Jarring Machine.—Referring to the article in *The Iron Age* of June 17, 1909, page 1912, describing the Murphy jarring machine as employed in the foundry of the Hooven-Owens-Rentschler Company, Hamilton, Ohio, the Tabor Mfg. Company, Philadelphia, Pa., writes us as follows concerning the statement that it differs from other machines principally in the construction of the jarring table, which is attached to and moves with the cylinder: "We would call your attention to the fact that we have been building this type of machine for many years and have protected this particular construction in our patent of June 23, 1908—No. 891,488, entitled "Jarring Machine"—and issued to the writer" [Wilfred Lewis].

The Bollinger & Andrews Construction Company, Pittsburgh, fabricator of structural material, is operating its plant at Verona, Pa., full time, and the foundry department is being worked double turn. The company in the last two months booked orders for 20,000 tons of castings, the greater part of which were ingot molds, to be delivered to various steel works during the last half of this year. It has found it necessary to increase its casting capacity and is having erected a 160 ft. addition to its foundry building, also adding two new cupolas, of the Whiting Foundry Equipment Company, a No. 9 with 18 tons and a No. 10 with 24 tons capacity per hour, a 20-ton electric traveling crane and an auxiliary crane.



Fig. 3.—An Example of Work Done Using the Attachment.

The Harmet Process of Ingot Compression.

BY J. F. SPRINGER.

Numerous articles have appeared from time to time in *The Iron Age* on the subject of segregation and piping in ingots.* These defects occur when the ingots are cast in the ordinary manner and are shown in sections of such ingots in Fig. 1. The common practice of discarding the upper portion of the ingot to get rid of the pipe and segregated section is wasteful. Sometimes as much as the entire upper half is cut off to insure perfectly sound and satisfactory metal, and while this does not mean that fully 50 per cent. of the weight of steel is discarded, inasmuch as the pipe itself is a hole and has no weight, it nevertheless means a tremendously excessive waste of steel. In the manufacture of steel rails, it has been common to discard about 10 per cent. from the Bessemer ingot of about three tons, but this is now thought to be

the effectiveness of any method of compression which permits the pipe actually to form. This is because of the uncertainty as to whether a real welding can be relied upon. At any rate the Harmet procedure begins within a very short time after the pouring.

The ingot mold is, on the whole, of a conical form upon the interior. The ingot, consisting of a thin shell and a liquid interior, is forced continuously toward the smaller end by a hydraulic ram pushing against the lower and larger base. The first part of the operation is to bring the ingot and the sides of the mold again into contact after the ingot has shrunk away due to the contraction of the cooling mass and the expansion of the mold. After contact is restored, the operation is uniform. As the taper is everywhere the same, the com-

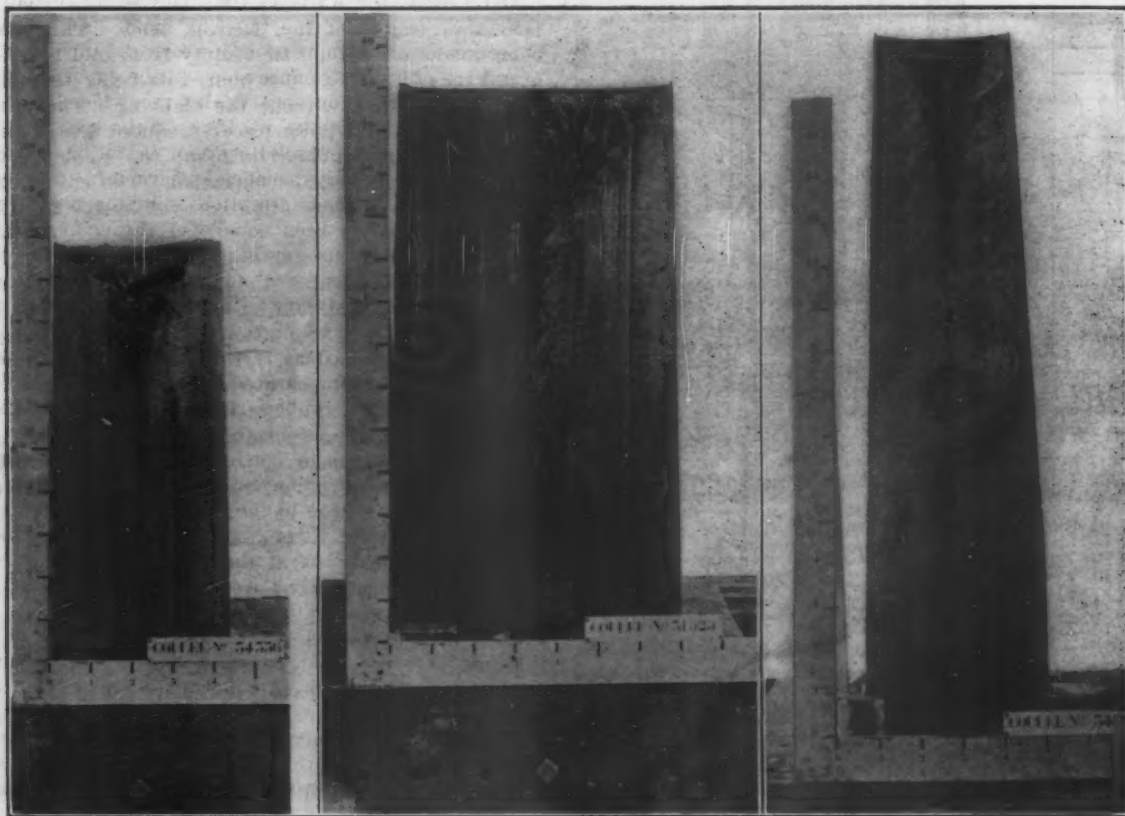


Fig. 1.—Uncompressed Ingots, Showing the Piping When Cast in the Ordinary Manner.

inadequate and as high as 30 per cent. discard has been advocated.

Some less expensive corrective has long been sought, and quite a variety of methods have been proposed to eliminate or reduce the pipe. Some are quite old, but in spite of the economic needs of a thoroughly practical method, there is to-day no process in general use. One or two processes have been pretty thoroughly tried out and have proved effective. One of these is the Harmet process of fluid compression, which has been in use for some years in Europe and has there found considerable adoption. It is essentially a wire-drawing procedure and sets up in the cooling metal tendencies operating in a direction opposite to those creating the pipe by commencing to compress the ingot about the central axis soon after the completion of the teeming. Almost the entire ingot is brought under pressure, which no doubt has a beneficial forging effect. There is some doubt of

pression is continuously the same in amount if the pressure of the ram continues uniform. Of course, some want of uniformity in compression may arise from differences in fluidity and the like at different places and at different moments.

The Harmet Apparatus.

The essential features of the apparatus used in the Harmet process may be understood by reference to Fig. 2, which shows the construction of the press. Two forged steel columns support the head on the bed and subbase. The latter is supported by brackets on the foundation. In the cast iron subbase is a cylinder *a*, containing the hollow piston *b*, and within the latter is the ram *c*. All three are forged steel. The bed serves as a guide for the ram. Upon the lower part of the upper head is an abutting plate, *d*, which is adjustable vertically, and above it is the stripping cylinder carrying a double acting piston.

The columns are hollow bolts, and one conducts the water to a pipe at the bottom, connecting with the hydraulic cylinder *a*. To start the press the attendant stationed on the platform operates the valve *f*. To show the position and rate of movement of the ram and to automatically stop the apparatus if necessary two cords are

* "Piping in Steel Ingots," by N. Lillenberg (illustrated), March 1, 1906, page 760; "Piping and Segregation in Steel Ingots," August 23, 1906, page 475; "Segregation in Steel Ingots," by J. E. Stead, October 18, 1906, page 1008; "Segregation in Steel," August 8, 1907, page 369; "Compression of Semi-Liquid Steel Ingots," by N. Lillenberg (illustrated), March 19, 1908, page 914.

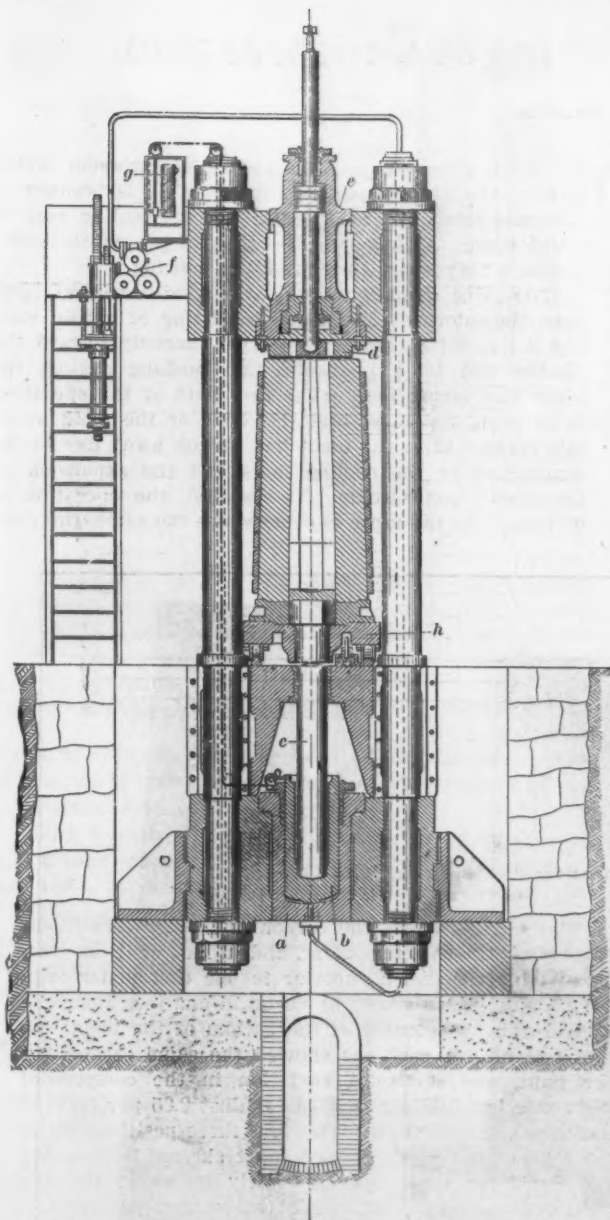


Fig. 2.—Sectional Elevation of a Harmet Ingot Compressor.

attached to the piston *b* and led through the hollow in the other column and under the guidance of pulleys, one to the indicator *g* the other to the accumulator.

The indicator consists of a vertical drum carrying a sheet of paper and a recording device. The drum is rotated by clock work and a pencil, the point of which is kept against the paper on the drum, is secured in a holder movable vertically on a guide. The string connected with the piston, which controls the movement of the pencil holder, is kept taut by a coil spring actuated drum. The vertical movement of the pencil corresponds with the advance of the ram. If the motion of the ram upward were always uniform, a straight line would be traced on the paper. In practice, however, irregularities occur which are reflected in the trace made by the pencil.

In Fig. 2 the ingot mold is shown in position. This is heavily reinforced by one, or perhaps two series of hoops,

and has a conical surface throughout the interior, except at the lower part, which is cylindrical. At the bottom is a removable cast iron disk, which protects the lower surface of the mold from the action of the molten steel during the teeming operation. The full mold is brought into position by a small car, *h*, a detail of which is shown in Fig. 3. This car runs on a short track and transports the mold with its contained ingot to and from the press. A pawl and rack arrangement actuates the car, the pawl *i* engaging with a rib projecting below the car bottom. The mechanism which operates the rack may be seen in some detail in Fig. 4. When the car is in exact position for compression a pin and socket lock it.

After the mold has been supplied with molten steel, the car moved into place and sufficient time has elapsed to secure the formation of the solid shell, with the upper plunger resting on the top of the ingot, the press is started by operating the valve *f*. The ram advances and operates against the movable plunger, which is located (see Fig. 2) just below the false bottom. The reason for the cylindrical form of the lower part of the mold is now apparent. Compression proceeds steadily and slowly, the walls of the ingot being forced inward by the reaction of the tapering mold. As solidification progresses the compression destroys the pipe as it forms, and the effects of compression will be experienced sooner or later throughout practically the whole of the ingot mass. This forge-like working of the metal, especially at the moment of solidification, is to be regarded as probably of a very beneficial character. The compression goes on without cessation from the beginning until solidification has been completed throughout the ingot. For most cases no further compression is applied, although it is considered advantageous to continue the process until ordinary atmospheric temperatures are reached.

The ideal aimed at is so to regulate the compression that it exactly compensates for the shrinkage due to contraction. This might be arrived at by operating the press according to some assumed approximate curve on the indicator blank, then by cutting open ingot after ingot to see whether results were what they should be, such corrections might be made to the curve as to produce a nearly perfect guide for future use. However, a simpler way was soon found. With the stripping cylinder removed a mirror was arranged over the press to reflect the top of the ingot, so that the operator could watch it. By keeping it full of metal to the brim, with just a tendency to overflow, a curve is secured on the indicator blank, which shows just how the press must be controlled in the future to repeat the results, and, thereafter, the mirror arrangement may be dispensed with. If the character of the steel is much changed in succeeding compressions a different chart must be determined.

Results of Compression.

In Fig. 5 are shown photographs of six ingots, each of about 265 lb. The first of these has undergone compression for 5 min. The metal was still liquid or plastic along the vertical axis and the pipe is plainly discernible. That compression has been more effective at the bottom is to be attributed to the presence on all sides but the upper of the solid walls of crust. Upon the upper portion of the bottom part of the mass is a considerable weight of metal. That another minute of compression is effective—in this sized ingot—in pipe elimination may be seen from the next, a 6-min. ingot.

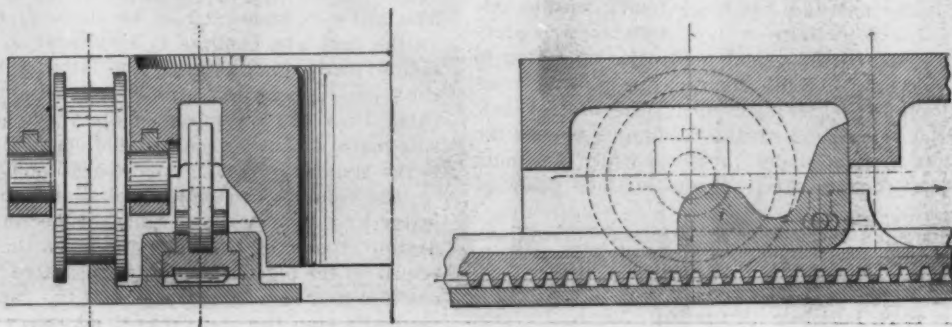


Fig. 3.—Details of the Ingot Car Truck.

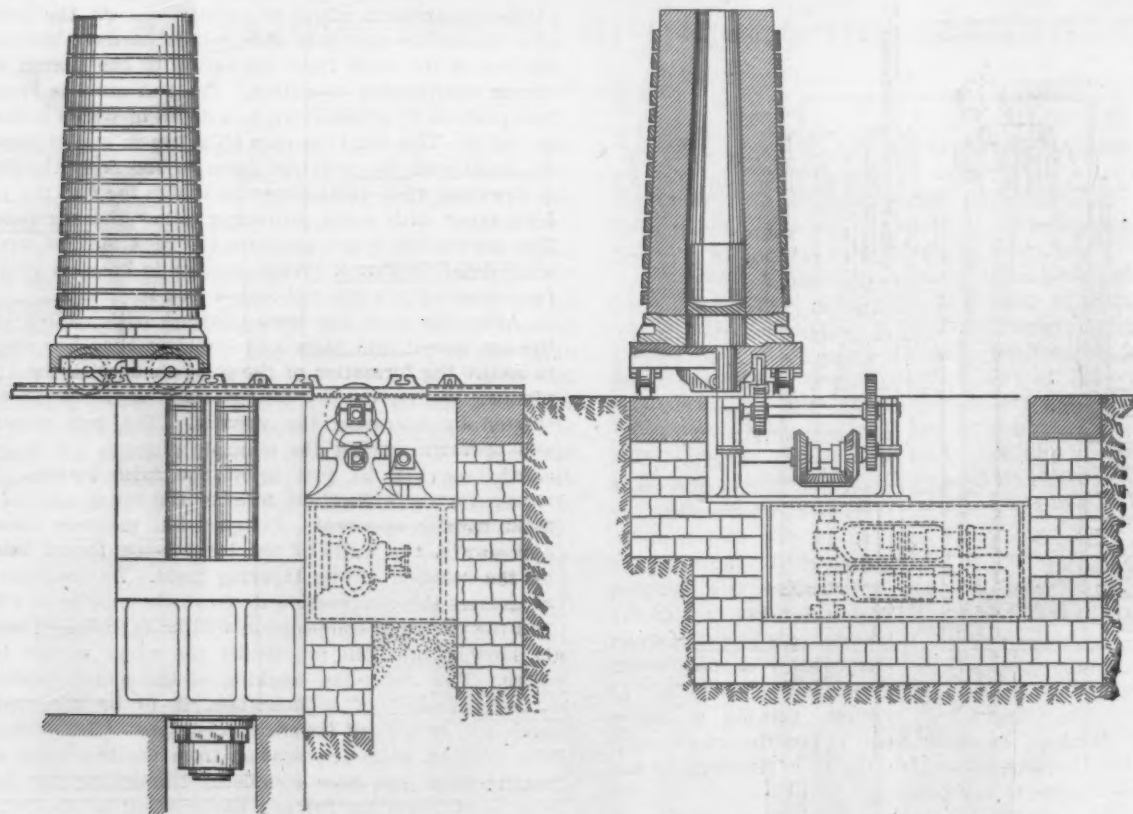


Fig. 4.—Elevations Showing the Mechanism for Positioning the Ingot Car.

The next ingot shows the result of 7 min. compression. Beginning with the next—an 8-min. ingot—the steel is completely compressed and free from pipe. The 8-min., $\frac{1}{4}$ -ton ingot represents the completion of the first stage of compression—that which is effective in the elimination of piping. But this metal is not to be regarded as absolutely perfect. The application, however, of the compression for another minute or two—see next two ingots—is effective in closing the cracks which arise from the contraction which goes on after the metal is completely frozen and while it is cooling to the ordinary temperature of the air. In Fig. 6 is shown a yet smaller ingot and one which has had compression for 8 min.

In Fig. 9 two large ingots about 5 ft. high are shown. The bases are about 28 or 33 in. wide. The tops, representing 4 per cent. of the ingot length, have been cut from both and the freedom from piping is evident from the cross sections shown.

The segregation of the carbon and other constituent elements is likewise important, and in lack of it the compressed ingot is again superior to one cast under ordinary conditions, as shown by chemical analyses along the central axis. Beginning at the bottom of the ingot, the first two of five positions showed the same carbon, 0.4 per cent., and the total variation in the compressed ingot was but 0.02 per cent., as against 0.05 per cent. in the uncompressed ingot. The first three positions along the axis of the uncompressed ingot showed 0.008, 0.007 and 0.007 per cent. sulphur—fairly uniform; but the positions showing considerable carbon segregation likewise disclosed a rise in sulphur to 0.010 per cent. With the compressed ingot the figures for the five positions are 0.008, 0.008, 0.009, 0.009 and 0.009 per cent. With regard to the distribution of the phosphorus, there seems to be but little to choose between the two ingots, the percentages in both cases varying from 0.023 to 0.025 per cent.

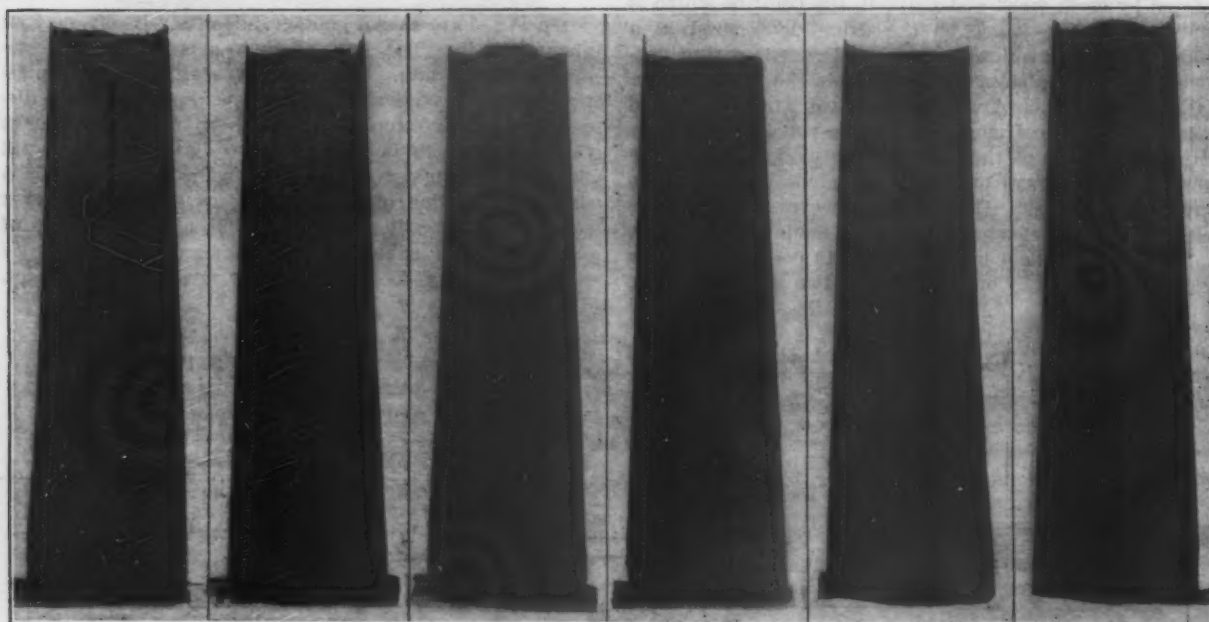


Fig. 5.—Ingots Compressed for Different Periods of Time.



Fig. 6.—A Smaller Ingot Compressed Eight Minutes.

To show the effect of compression upon the character of the steel micrographs have been taken from samples from various positions within two ingots—one compressed, the other, not. Fig. 7 gives a diagrammatic representation of the locations of the various samples, the numbers shown corresponding to those of the micrographs in Fig. 8. Three samples from each ingot about half way between top and bottom are shown. The greatly superior character of the compressed steel is at once evident, as also in the two samples from each ingot lower down. The two samples from the upper part of the central axis of the Harmet ingot show a fine structure and there is, of course, nothing to corre-

spond to them in the other ingot. Upon the whole, comparing the two sets of samples, the finer structure of the compressed steel is conspicuous.

With regard to the comparative merits of compressed and uncompressed ingots from the point of view of mechanical tests, the accompanying two tables are instructive.

It should be particularly noticed that both the tensile and the impact tests for the specimens taken from the top of the uncompressed ingot, after the enormous discard of 28 per cent. had been made, failed utterly to give any results. This would seem to indicate that 28 per cent. was insufficient.

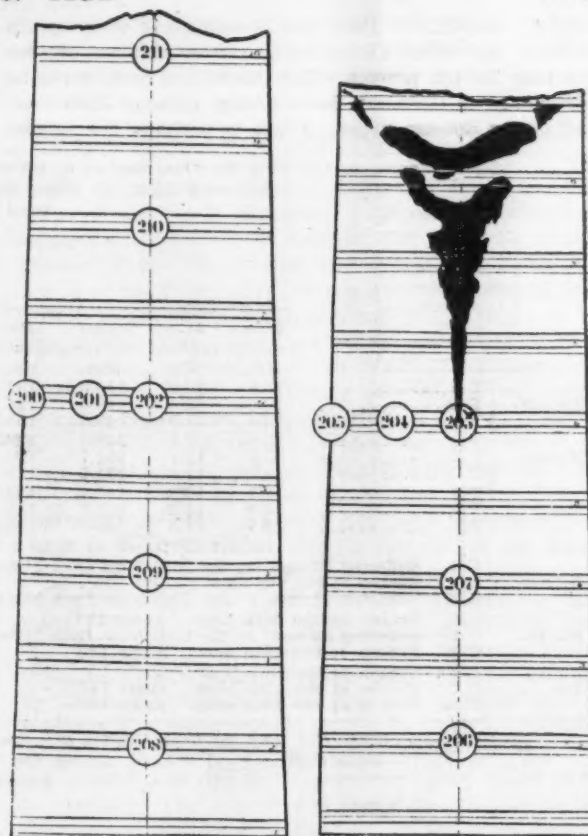


Fig. 7.—Diagrams of Compressed and Uncompressed Ingots, Giving the Location of the Parts from Which the Micrographs in Fig. 8 Were Taken.

Present Use of the Process.

This system of ingot casting has been in operation for eight years or thereabouts and has demonstrated its excellence by repeated tests. The Aciéries de St. Etienne, France, have in use nine presses. One large compressor of 5000 tons is capable of taking an ingot of 32 tons'

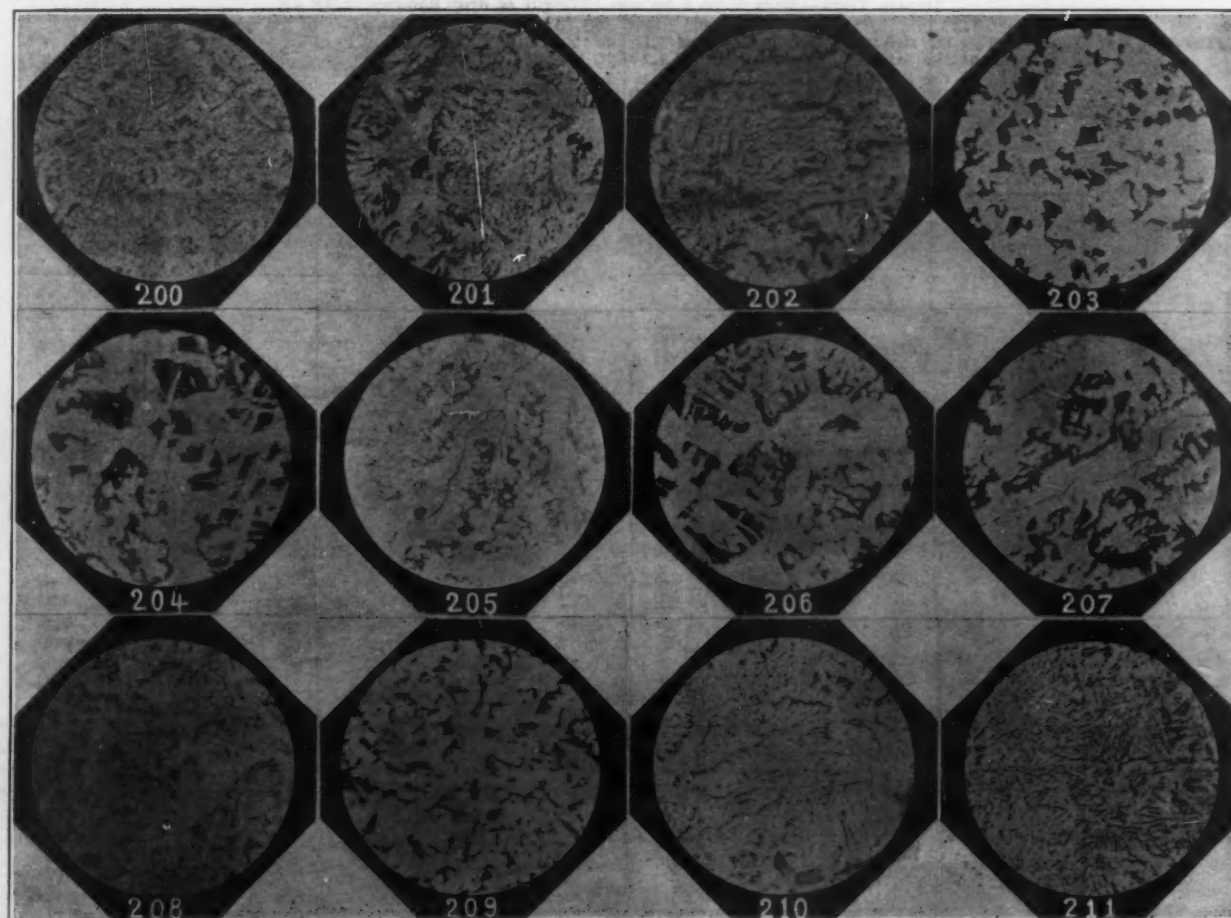


Fig. 8.—Micrographs Comparing the Structure in Various Parts of Compressed and Uncompressed Ingots.

weight. Another of 1800 tons is competent to compress an ingot of 8 tons. There are also three 1000-ton presses and four 500-ton presses. The Oberbilker Stahlwerke at Düsseldorf, in Germany, have a large press of 3500 tons, and also a 500-ton press. What is perhaps the largest

press of the Harmet type is one used by Brown at Sheffield, England. This is a 600-ton apparatus, capable of compressing a 40-ton ingot. There were in operation on July 1, 1908, 32 or more Harmet presses. These were scattered over Europe from Russia to England, Scotland

Table I.—Specimens Cut from the Cross Section of a Slab Containing the Vertical Axis of a Harmet Ingot. Compressed Ingot, the Waste Being 5 Per Cent. of the Total Length. Tensile Tests.

Marks.		Dimensions.		Areas.		Elastic limit per mm ² .	Load producing rupture.		Kg. per mm ² .	Elongation after rupture.		Frac.	Remarks.
		Before rupture.	After rupture.	Before rupture.	After rupture.		Total.	In a S-S'.		Per ct.	Per ct.		
		Mm.	Mm.	Mm.	Mm.		Kilograms.	per 100 mm.		Per ct.	Per ct.		
Bottom..	T 1.....	13.8	13.0	149.6	132.7	71.6	11,000	73.5	5.0	12.7	BK	.....
	T 2.....	13.8	12.6	149.6	124.7	72.9	12,000	80.2	7.0	20.0	BK	.....
	T 3.....	13.8	11.5	149.6	103.9	69.6	12,300	82.3	11.0	44.0	B	.....
Middle...	T 1.....	13.8	12.8	149.6	128.7	71.6	12,600	84.3	7.0	16.2	BK	.....
	T 2.....	13.9	12.7	151.7	126.7	71.2	12,400	81.7	6.0	19.8	K	.....
	T 3.....	13.9	12.8	151.7	128.7	71.2	12,600	83.1	7.2	17.9	BF	.....
Top.....	T 1.....	13.7	13.3	147.4	134.8	70.5	10,400	70.5	3.0	6.1	BD	.....
	T 2.....	13.9	13.2	151.7	136.9	75.1	12,500	82.4	7.0	10.9	B	.....
	T 3.....	13.8	11.5	149.6	103.9	74.9	12,300	82.3	10.5	44.0	BF	.....
Impact Tests.—Bars = 20 x 20 mm. Weight of drop hammer = 18 kg.													
Bottom..	C 1.	Deflected 33 mm. at the 20th blow from hight of 1.10 m. Broken in the press at an angle of 92°.											
	C 2.	Broken at the 8th blow. Angle 148°.											
	C 3.	Deflected 31 mm. at the 20th blow from hight of 1.10 m. Broken in the press at an angle of 90°.											
Middle...	C 1.	Broken at the 20th blow. Angle 113°.											
	C 2.	Deflected 32 mm. at the 20th blow from hight of 1.10 m. Broken in the press at an angle of 98°.											
	C 3.	Broken at the 13th blow. Angle 135°.											
Top.....	C 1.	Broken at the 13th blow. Angle 150°.											
	C 2.	Broken at the 12th blow. Angle 142°.											
	C 3.	Broken at the 18th blow. Angle 102°.											

Table II.—Specimens Cut from the Cross Section of a Slab Containing the Vertical Axis of Uncompressed Ingot. Ingot Cast in Mold Without Lining, the Waste Being 28 Per Cent. of the Total Length. Tensile Tests.

Marks.		Dimensions.		Areas.		Elastic limit per mm ² .	Load producing rupture.		Kg. per mm ² .	Elongation after rupture.		Frac.	Remarks.
		Before rupture.	After rupture.	Before rupture.	After rupture.		Total.	In a S-S'.		Per ct.	Per ct.		
		Mm.	Mm.	Mm.	Mm.		Kilograms.	per 100 mm.		Per ct.	Per ct.		
Bottom..	T 1.....	13.8	12.8	149.6	128.7	72.9	12,200	81.6	8.0	16.2	D	.....
	T 2.....	13.9	13.0	151.7	132.7	66.6	10,700	70.5	5.0	14.3	KD	.....
	T 3.....	13.9	13.4	151.7	141.1	68.5	11,000	72.5	6.5	7.6	KD	.....
Middle...	T 1.....	13.9	13.2	151.7	136.9	69.9	11,000	72.5	4.5	10.9	KD	.....
	T 2.....	13.8	13.0	149.6	132.7	61.5	9,200	61.5	2.0	12.7	KD Blowholes.	.....
	T 3.....	13.8	13.3	149.6	139.0	62.6	9,500	62.6	2.3	7.7	KD Blowholes.	.....
Top.....	T 1.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	T 2.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	T 3.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Impact Tests.—Bars = 20 x 20 mm. Weight of drop hammer = 18 kg.													
Bottom..	C 1.	Deflected 32 mm. at the 20th blow from hight of 1.10 m. Broken in the press at an angle of 79°.											
	C 2.	Broken at the 3rd blow from a hight of 1.10 m. Angle 160°.											
	C 3.	Broken at the 5th blow from a hight of 1.10 m. Angle 152°.											
Middle...	C 1.	Broken at the 8th blow from a hight of 1.10 m. Angle 141°.											
	C 2.	Broken at the 6th blow from a hight of 1.10 m. Angle 148°.											
	C 3.	Broken at the 5th blow from a hight of 1.10 m. Angle 154°.											
Top.....	C 1.	Defective bar. Results nil.											
	C 2.	Defective bar. Results nil.											
	C 3.	Defective bar. Results nil.											

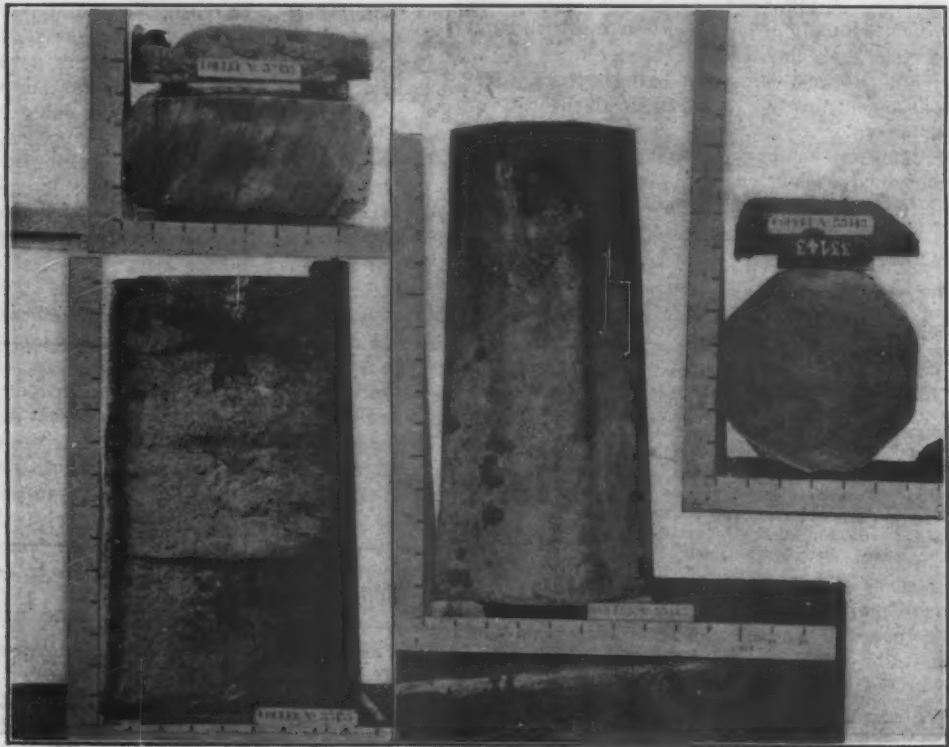


Fig. 9.—Ingots with the Tops Cut Off, Showing the Freedom from Piping.

and France. And still others were building or being installed. This system can scarcely be regarded, therefore, as an experiment.

It is possible that its application to Bessemer rail ingots of small size ($2\frac{1}{2}$ and 3 tons) might be thought impracticable on account of the time involved in actual compression. But with a great battery of small presses, a sufficient output of such ingots could probably be secured at a reasonable cost per ingot. For large ingots of the finer steels, there can hardly be any question in view of the European success. Two factors control here—the immense saving of discard and the betterment of the steel itself. The French Government accepts Harmet ingots with a 5 per cent. discard, as against about 28 per cent. for uncompressed blocks.

Customs Decisions.

It has been decided by the Board of United States General Appraisers that excess automobile tires are not entitled to enter this country free of duty. On the contrary, it is held that tires of this character are dutiable properly at the rate of 30 per cent. under the tariff provision for manufactures of rubber.

In sustaining a protest filed by A. & H. Veith, the board holds that steel stampings are entitled to enter this country at the specific rates provided for under the paragraph in the tariff for "pressed, sheared or stamped shapes" of steel. The action of the collector in levying duty at 45 per cent. as "manufactures of metal" is reversed.

A protest by F. W. Myers & Co., asking for a reduction in the assessment of duty on corundum ore was denied.

Judge Lowell, in the United States Circuit Court at Boston, has affirmed the action of the Board of General Appraisers in holding that forged rifle barrels rough bored are dutiable properly as "rifles and parts thereof" within the meaning of the Dingley tariff. According to the contention of the Government, the articles are assessable as "manufactures of metal," with duty at the rate of 45 per cent. After the Government was defeated before the board, it appealed to Judge Lowell to reverse the lower tribunal's ruling, but this the judge declines to do. J. G. Riga appears in the action as the importer of the goods, but a large number of other importers have similar claims pending.

Judge Platt in the United States Circuit Court has affirmed a decision of the Board of General Appraisers in the cases of Maldonado & Co. and Hensel, Bruckmann & Lorbacker. The merchandise concerned relates to the classification of horseshoe calks and ball bearings. The Government assessed duty on the articles at the rate of 45 per cent. ad valorem as "manufactures of metal," whereas the importers maintained that the merchandise should be classified at various specific rates as being "steel in all forms and shapes." The difference in the rate of duty is considerable. In finding for the Government, Judge Platt said:

There is no doubt about these importations, steel horseshoe calks in the one case and ball bearings in the other, going into paragraph 193, unless paragraph 135 is more specific. The importers insist that "steel in all forms and shapes," found in paragraph 135 describes them. We then go to gun barrel molds, then to steel castings, then to sheets and plates, and then immediately to "steel in all forms and shapes." It is true that Congress must have had in mind in this last phrase forms and shapes upon which a large degree of labor had been expended in addition to that required to produce sheets and plates. But, as the board says, every manufactured article must have form and shape, and it is not conceivable that Congress intended to provide in paragraph 135 for such distinctively finished products as those now at issue. Decision affirmed.

A claim filed by the Consolidated Kansas City Smelting & Refining Company, questioning the weights of lead in ores, as returned by customs officials, was sustained and a reliquidation of the entries ordered.

The Albany Malleable Iron Company in announcing that it has taken over the business of the Torrance

Malleable Iron Company refers to its new plant at Voorheesville, N. Y., near Albany, the product of which is semisteel and malleable iron castings.

One British Patent Revocation Reversed.

The British Westinghouse Electric & Mfg. Company, Ltd., and Korting & Mathiesen, a German firm, appealed before Justice Parker at London, Eng., May 25, from a decision of the Comptroller of Patents, who under Section 27 of the Patent and Designs Act, 1907, revoked their British patents for the manufacture of arc lamps on the ground that they were not being sufficiently worked. Justice Parker found that the Westinghouse Company, which had acquired the Bremer patents and was manufacturing under them in Great Britain, had to overcome the bad reputation resulting from the fact that at the start a good many defective lamps were put out. The company is still unable to compete strongly with the product of the German firm of Korting & Mathiesen, with which it had an arrangement for the sale of the latter's Bremer lamps in Great Britain. The Court said he was convinced that it was to the interest of the company to manufacture to as great an extent as possible in Great Britain, as the profit it made on each lamp was greater than the royalty paid it on each lamp imported and sold by it for the German firm. He was satisfied that the company was using its best endeavors to fulfill its obligations under the act, and that its want of success up to the present was due to circumstances over which it had no control. The appeal was therefore allowed, as was also that of Korting & Mathiesen. Of the latter firm, the Court said that they made no attempt to work their patent in Great Britain except through the Westinghouse company, but on the other hand they might fairly say that they had granted a free license to the English company to manufacture these lamps in Great Britain, and that they had precluded themselves from selling them without paying a substantial royalty.

Iron Ores of the Appalachian Region in Virginia.

The Geological Survey's bulletin entitled "Contributions to Economic Geology for 1908, Part I," contains a preliminary report on the iron ores of the Appalachian region in Virginia, by E. C. Harder. The report contains a short review of the iron ores of the Piedmont region and describes in some detail those of the Appalachian region. The Appalachian iron ores of Virginia are principally brown ore of three varieties and hematite of two varieties. Magnetite occurs at a few localities, associated with limestone. Iron carbonate is found locally as concretions in many of the shale formations. Pyrite is found in sufficient abundance in some places to be used in the manufacture of sulphuric acid, while the residue of iron oxide (blue billy) is used by blast furnaces.

The mountain brown ores occur along the Blue Ridge and in the New River District in small pocket-like deposits in residual material. The principal ore bearing areas lie in two belts, one extending from Front Royal on the north to Roanoke on the south; the other from Allisonia on the northeast to a point within a short distance of the Tennessee line. Between these two belts is a nonworkable area about 40 miles in length. At few places is either bed more than a few miles wide.

In the Blue Ridge District the ores occur mainly at or near the west foot of the mountains, in the New River District on the north slopes of the ridges south of the valley of New River and on minor ridges within the valley. Mr. Harder's report contains many geologic sections and analyses of ores.

The contract for building the Government dry dock at Pearl Harbor, Hawaii, was awarded at Washington last week to the San Francisco Bridge Company. The masonry and cement work will cost \$1,760,000. The dock is to be 620 ft. long and 140 ft. wide.

The Riblet Transverse Current Water Heater.

Probably the first successful device for utilizing the waste heat of a gas engine is the transverse current water heater manufactured by the Riblet Heater Company, Erie, Pa., which is designed to heat water from the exhaust of either a steam or a gas engine. That it is a departure from the usual apparatus of its kind, both in design and construction, may be seen from Fig. 1, which shows the heater complete, and from Fig. 2, where the front and back circulation plates are removed exposing the water passages.

Only 30 per cent. of the heat value of the gas is realized in developing power in a gas engine, the balance is wasted through the exhaust and the water used to cool the engine. The exhaust has a temperature of from 600 to 1000 degrees F., and the transverse current heater is designed to save this heat, as well as that from the jacket water, and utilize it for heating water for whatever purpose may be desired in a factory, hotel, office building or laundry. Assuming that a gas engine uses 15 cu. ft. of gas per horsepower-hour, the heat generated will equal 15,000 B.t.u. per hour, and as less than one-third of this heat is transformed into power the remainder, over 10,000 B.t.u., is available for heating purposes. As 1 B.t.u. will raise the temperature of 1 lb. of water 1 degree, 10,000 B.t.u. per hour will raise the temperature of 62½ lb. of water per hour from 40 to 200 degrees, or, in other words, after allowing for losses due to radiation, &c., a transverse current heater may be used to raise the temperature of nearly 7 gal. of water an hour from 40 to 200 degrees for each horsepower developed by the gas engine.

As a feed water heater the transverse current heater has the advantages of being made entirely of cast iron which has little tendency to corrode or be affected by



Fig. 1.—The Transverse Current Water Heater Built by the Riblet Heater Company, Erie, Pa.

electrolysis or acids. It has no tubes to collect scale, no internal joints to leak, no floats or valves to require attention, and the water does not come in contact with the exhaust. It is practically self-cleaning, as scale does not readily adhere to cast iron, but since the water passages are always accessible by removing the circulation plates (see Fig. 2) they can be easily cleaned of any sediment that an occasional flushing out fails to remove.

The heater consists of a series of flat rectangular passages of sufficient number to give the required heating surface, the exhaust and water passages alternating and extending transversely to each other, but with their walls integral, and the whole cast in a solid section. To this section are bolted the circulation plates which direct the course of the exhaust and water through their respective passages. The exhaust enters the heater

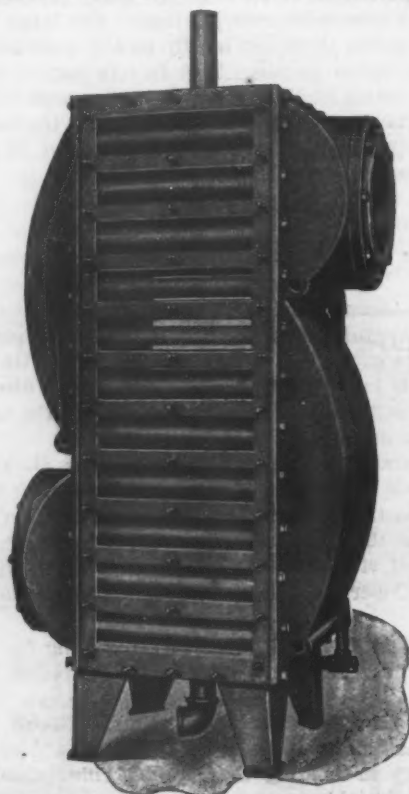


Fig. 2.—The Heater with the Front and Back Circulation Plates Removed.

at the bottom, passes through a sufficient number of ports at one time to avoid material back pressure on the engine, and goes back and forth through the heater from three to five times before reaching the exhaust outlet at the top.

The water enters the heater at the top, goes through only one passage at a time, traveling downwardly in a transverse and reverse direction to that of the exhaust, and in this way the hottest water just as it leaves the heater at the bottom passes through the section heated by the hottest exhaust. When more convenient for installation, this order can be reversed without interfering in any way with the circulation. The entire heating surface is made effective, and as the water is constantly agitated the efficiency of the heat absorption is high.

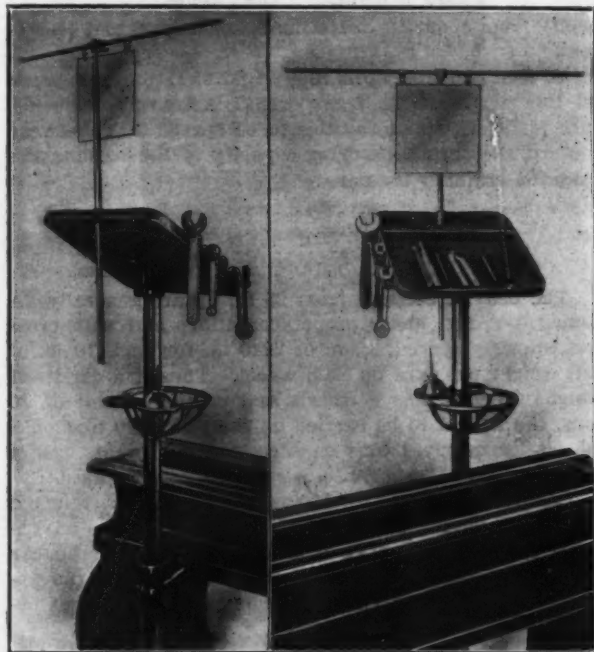
It is declared that the heater has been thoroughly tested out for several months in connection with both steam and gas engines with highly satisfactory results.

Electricity in Rolling Mills.—One entire session of the forthcoming meeting of the American Institute of Electrical Engineers, at Frontenac, N. Y., that of Wednesday morning, June 30, will be given to the reading and discussion of papers on the application of electricity to rolling mill work. The programme embraces the following: "Function of Flywheels in Connection with Electrically Operated Rolling Mills," by H. C. Specht; "Alternating Current Motors vs. Direct Current Motors in Steel Mills," by K. A. Pauly; "Rolling Mill Motors," by E. W. Yearsley; "Electric Driven Rolling Mills," by E. Friedlander; "Power Requirements for Rolling High Carbon Steel of Small Section," by B. Wiley; "Application of Storage Batteries to the Regulation of the Alternating Current Load at the Plant of the Indiana Steel Company, Gary, Ind.," by J. L. Woodbridge; "Electrical Control for Rolling Mill Motors," by C. T. Henderson, and "Automatic Motor Control," by H. E. White.

The Wells Lathe Tool Rack.

A tool rack which can be fastened to any lathe is made by the F. E. Wells & Son Company, Greenfield, Mass. It provides two brackets for oil cans, a basket for waste, a tray for lathe tools, chucks, centers, &c., and on the side a place for wrenches. Fastened to the back of the tray is an adjustable blue print holder for holding prints up to 26 x 30 in. The tray and the oil can and waste holder are adjustable in height and can be swiveled to stand at any angle. No holes need be tapped or drilled in the lathe bed; all that is necessary to fasten the holder to a lathe is to tighten one screw which clamps it to the side of the bed. This screw does not show, as it is inside the lathe bed.

This holder will be found very useful as the tools, wrenches, cans, waste, &c., which are always used about a lathe are in their proper place, and being right in front of the operator it is the natural place for him to put them instead of as now laying them around on



A Rack for Lathe Tools, Oil Cans, Waste and Blueprints, Made by the F. E. Wells & Son Company, Greenfield, Mass.

the ways, tailstock, &c., where they are always getting knocked off, or on the bench, where they are lost. The blue print holder also keeps the blue print right in front of the operator and saves it from getting torn or soiled, as it does when laid out on the bench.

Continuation Schools at Cincinnati.

The Education Committee of the Cincinnati Metal Trades Association has found prompt co-operation from the city school authorities in its plan for "continuation schools." F. A. Geler, Cincinnati Milling Machine Company; B. B. Quillen, Cincinnati Planer Company; William Lodge, Lodge & Shipley Machine Tool Company, and others have done no little pioneering in this direction. Mr. Geler's experiments were along practical lines, as he maintains in his plant for some time a school of his own; but, realizing that this would be scarcely possible in all establishments, the idea of providing a centrally located building, wherein young people could be gathered from the masses of manufacturing establishments, was advocated. The Board of Education received the ideas of the manufacturers with enthusiasm and offered co-operation willingly. The selection of a building in which the school can be started is in the hands of Superintendent Dyer of the public schools. A location on Ninth street is thought to be favored. Young men and boys who are on the payroll of local plants will be sent to this school and instructed in the branches which they ought to understand—to make capable machinists,

draughtsmen, &c., and on the employers' time. Dean Herman Schneider of the University of Cincinnati is greatly interested in the scheme and is co-operating with the Metal Trades Association in working for its success. He has this to say on the subject:

The movement inaugurated by the Industrial Education Committee of the Cincinnati Metal Trades Association for a continuation school under the public school system is another evidence of the broad educational policy adopted by the metal trades companies of Cincinnati some time ago. The plan proposed by them injects strength into the very weakest parts of our school system and opens up great possibilities for general industrial education. I consider their action as the most important step so far undertaken in this country for the training of industrial workers. No doubt their action will be followed in a similar way by manufacturers in other fields of industry in Cincinnati, and will lead to the solution of the very vexing problem of giving instruction in efficiency to that great army of young men and women who are forced by circumstances to leave the public schools at an early date. The economy of the scheme presented must appeal especially to the school authorities and tax payers, for the plan contemplates only classroom instruction and not machine instruction, the latter being given in the commercial shops. This, together with the rotation of apprentices on separate half days, will enable the schools to instruct a large number of students in the things they ought to know to make them more efficient, with the smallest possible outlay of money.

Time Records for Heavy Freight Trains.

A record in the movement of a heavy freight train was made on June 14 on the Pennsylvania Railroad between Altoona and Enola, near Harrisburg, Pa. To determine what could be done as the result of some of the company's recent expenditures for improvements, 85 steel gondola cars loaded with 4451 tons of coal were attached to a freight engine of the most approved type. The total weight of the train was 6151 tons and its length was 3000 ft., nearly 3.5 mile. The run of approximately 124 miles was made in 7 hr. and 15 min., the average speed of the train being about 17 miles per hour. The heaviest trains moved between Altoona and Enola prior to this record run were all handled in June, the results being as follows:

	Number of cars.	Weight of train.	Time.	
		Tons.	h.	m.
June 8.....	75 steel.	5,307	10	21
June 8.....	75 steel.	5,348	8	2
June 8.....	75 steel.	5,348	10	12
June 3.....	85 mixed.	4,852	12	30
June 5.....	86 mixed.	4,922	9	42
June 8.....	87 mixed.	4,623	10	21

These runs were made possible by the fact that the company has now reduced all grades and compensated all curves on the Middle Division of its main line between New York and Pittsburgh, so that the ruling grade there is only 0.2 per cent., or less than 12 ft., to the mile. The last step in this scheme of improvements was taken lately in the opening to service of the four tracks, involving radical revisions of grade and removal of curvature for the 11 miles between Mt. Union and Ryde. Formerly it was necessary to have a "pusher," or extra locomotive, help long freight trains over the heavy grades. Now it is possible for single locomotives unaided to accomplish the results indicated above.

W. C. Brown, president of the New York Central lines, reports that the movement of loaded cars on those lines for May reached a total of 1,567,993, an increase of 297,634 over May, 1908. This was the best May record in the history of the system, with the exception of that for May, 1907. In view of expenditures of \$20,000,000 on the lines east of Buffalo in the past two years the New York Central is in a position to-day to handle 20 per cent. more traffic than in the boom. It is expected that all business offered will be handled without difficulty this year, even in the event of a maximum crop yield.

The German foundry journal, *Giesserei-Zeitung* of Berlin, prints an elaborate article in the issue of June 1, descriptive of the Veeder castings, invented by C. H. Veeder of Hartford, Conn., the process for which has been acquired by Ludw. Loewe & Co. of Berlin.

Industrial Haulage.

BY DONALD PARSON.*

The question of industrial haulage is intimately connected with the problems of economic procession through the various stages of manufacture. There are in the main four means of propulsion: hand, animal, cable (including rope haulage, both tail and continuous) and locomotive (steam, electric and gasoline). The chief determining factor in the choice of these methods is the material to be conveyed. The core oven truck or the small platform car used to carry stiff mud to the drying kilns of a brick plant, from their light weight and short travel, are used to best advantage as push cars. Conversely, the heavily loaded ingot buggies of the steel plant, from the nature of their service, are precluded from hand haulage and are best managed with locomotive



Steel Blast Furnace Skip Car.

traction. Local conditions which are purely occasional, such as length of haul or the size of the enterprise, will enter into the choice, but in the majority of cases the material will determine the means.

In general the trend of practice is toward the more expensive installation where the scale of operations will justify the outlay. Thus coal mining has progressed from the push car to the mule train, from the mule train to rope haulage and from rope haulage to the electric locomotive. In the same way, the weight of rail used has increased from the very light sections to 40 lb. and in some cases to 60-lb. sections. Similarly, the old style of cheaply constructed wooden pit wagon is being superseded by the all-steel mine car; the company with which the writer is connected has furnished 400 of these to a single operator. It seems to be established that such improvements, while exceeding in initial cost the cheaper equipment, will justify themselves in a consideration of the ultimate cost per ton mile.

Cable haulage can sometimes be used profitably, and though the first cost is considerable, the labor eliminated by a skillfully laid out automatic cable railway will in the end often result in a final, real economy instead of an apparent loss. Such installations are quite common



Steel Rail Car.

for coaling stations where the practice is briefly as follows:

The coal may be unloaded from barges with a grab bucket, dumping either immediately or through a hopper into the cable car. This car runs on an elevated trestle,

* The Youngstown Car Mfg. Company.



Steel Gable-Bottom Cable Car with Brake.

is automatically tripped by a knockout arrangement and empties its contents into the storage pockets. The United States Government has been quick to see the advantage of such an equipment, and now coals most of its warships in such a manner. The cars used vary in capacity from about 80 to 160 cu. ft., or from 2 to 4 tons of coal.

In iron and steel mills the weight of rail used depends on the weight to be transported. Assuming 4-wheeled cars to be used and the ties to be spaced 3 ft. between centers, the normal carrying capacity of the various size rails for ordinary uses are:

8-lb. rail.....	2 to 3 tons.
12-lb. rail.....	3 to 4 tons.
16-lb. rail.....	4 to 5 tons.
20-lb. rail.....	5 to 8 tons.

The heavier sections from 25 lb. up are generally assumed to carry, under proper conditions and with cross ties properly spaced, 1 ton of 2240 lb. for each 10 lb. of rail weight per yard on each wheel. Thus if a car itself weighs 10 tons, has 8 wheels and carries a load of 20 tons, the weight to be carried on the rail is 30 tons on 8 wheels, or nearly 4 tons on each wheel. In this case a rail weighing at least 40 lb. per yard should be used.

Some steel mills have attempted to adopt a standard practice of having the gauge of track 36 in. The advantages of such a practice would be several for the car builder, but for the steel mill inconsiderable, as the absence of any necessity for interchange of equipment be-



Steel Billet Car.

between mills makes standardization unnecessary. Indeed, track gauges will be found to vary from the extremes of 18 in. to 4 ft. 8½ in. In favor of the smaller gauge may be cited lower cost of roadbed, smaller space required and an adaptability to sharper curves. Greater stability in operation and better service under high speeds recommend the broader gauges. Thus the ordinary manufacturing plant, transporting light loads at low speed, will adopt the smaller gauge; ore mines are almost invariably supplied with 18 or 20 in. track, because of limitations of space. Larger operations may find that a gauge of 3 or 3½ ft. admits of all the speed and sharpness of curves required, while still economizing in space over a standard gauge track.

A very great many different types of cars are made; the company with which the writer is connected has several thousand different styles. Among the more usual types are the flat car and the various dump cars, side, end, bottom and all around; the names alone are sufficient description of the design. The variety of special cars for iron and steel mills is much greater. The accompanying illustrations show some of these cars.

In inquiring for such equipment one will minimize correspondence and obviate delay if the following information is supplied with the letter of inquiry:

Gauge of track (inside distance between rail heads).
 Weight of rail on which cars run.
 Radius and length of sharpest curves.
 General style of car desired.
 Material to be handled, and its weight per cubic foot.
 Capacity of car in tons or cubic feet.
 Any limitations as to height, length or width.
 Style of coupling and drawbar.
 Distance from top of rail to center of drawbar.
 Are cars to be operated by hand, cable, animal, steam or electricity?
 Are cars to be used singly or in trains?
 If in trains, how many cars to a train?
 Diameter of wheels and axles; if new cars are to be used with old ones.
 Style of axle boxes, whether inside or outside.
 Whether with or without springs.
 Kind of bearings desired, whether roller, brass, babbitted or plain.

It should be remembered that cars for iron and steel mills should be more than duly strong on account of the severe use to which they are put, and the best industrial car builders make them extra heavy. It, therefore, is only fair to them that purchasers should note carefully the price per pound offered by the various bidders, or better yet, specify the weight of car desired. Some such protection to both buyer and seller would do much to eliminate the cheaply made lightweight car.

The Hess-Bright Ball-Bearing Propeller Thrust Block.

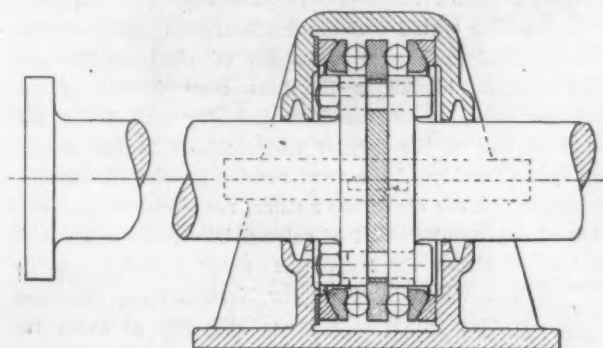
Many troublesome features are inseparable from the usual propeller thrust block, be it small or large, of the simplest multiple fixed collar type, or made up of many adjustable blocks. The illustration shows a ball bearing thrust block made by the Hess-Bright Mfg. Company, Philadelphia, Pa., which has the advantages of being shorter, lighter, and practically frictionless, and it requires no adjusting, no constant oiling, no water cooling. In the modern type of cargo carrier with this type of bearing it is possible to move the engine still farther aft and so gain valuable cargo space.

There is nothing new in the idea of the ball bearing; its advantages were realized long before the engineering world commanded the skill necessary to produce balls of sufficient accuracy. With the advent of that skill the ball bearing quickly came into use; for a time it was able to maintain itself in light work only. The reason for this was the absence of fundamental data for proper design for heavy duty and the insufficiency of the available materials. The advent of the modern nickel, manganese, chromium, tungsten and molybdenum alloy steels made possible the introduction of the ball bearing into every line of mechanical engineering, for every character of service, under light or heavy loads, at high or low speeds. Naturally the invasion first followed the line of least resistance, of greatest return for a given expenditure of effort, and therefore into that class of machinery that demanded the greatest number of medium load bearings. The demand for heavy thrust bearings was practically confined to the very modern high speed turbine and to marine engineering, but now the long experience with ball bearings in other lines has been followed by rigid and prolonged experimentation to develop proper types and dimensions for marine work.

The engraving shows a marine propeller thrust block unit for forward and reverse, capable of safely withstanding a service thrust of 50,000 lb., or sufficient for a vessel of medium tonnage. The design shown is adapted to the practice of building up the propeller shaft in sections coupled by solid flanges. The ball bearing itself consists of three plates, with a circular row of balls on either side of the center plate. The outer plates are seated on adjusting plates that are cupped to sections of a sphere; these insure an even distribution of the pressure over the entire row of balls and compensate for small changes in alignment of the shaft sections. The central ball track plate is centered on a blind flange and is solidly clamped between the coupling flanges. The en-

tire space occupied by this propeller thrust block is but little greater than that taken up by two coupling flanges, and its diameter also is but little greater. The whole is inclosed by a capped block, the lower half of which contains a supply of lubricant that insures long periods without attention. The friction is so small as to be negligible. There is consequently a total absence of heating, so that all need for water cooling is done away with. Since there is no wear of the ball bearing all of the labor and attention demanded in the frequent adjustment of the ordinary propeller block is saved.

This ball bearing block may be placed wherever convenient. Owing to its short length it may even be placed close up to the stern journal of the engine. Block for block, it is claimed to cost less to install than any plain block with adjustable shoes. The difference is still greater when the cost of spares is taken into account. It is usual to carry a spare thrust collar shaft section; the exchange of the one damaged for such a spare is costly, and, more important still, takes time at the most inopportune moment. Instead of carrying separately a spare ball bearing to be exchanged, two each of sufficient capacity may be installed in operative relation. In regular working the load will be more or less evenly divided between these. Should one develop a defect, then the other at once will automatically take the entire load. There is thus no awkward exchange of bearing parts and



Section of a Ball Bearing Propeller Thrust Block Made by the Hess-Bright Mfg. Company, Philadelphia, Pa.

no delay. The space taken up by two such bearings is less than that taken by a single plain thrust block.

Should the engine builder or engineer entertain any doubt as to the reliability of the ball bearing thrust block, then the arrangement recommended is the installation of such a ball bearing block in connection with the usual plain block; the shoes of the latter may be relieved of all load, but be in readiness to take it against the chance of trouble developing, after a slight adjustment.

Erie Canal & Great Lakes Transportation Company.—The New York, Buffalo & Great Lakes Transportation Company has been incorporated by New York City and Tonawanda, N. Y., interests to engage in the freight forwarding business between New York, Buffalo, and Chicago, and intermediate cities via the Hudson River, Erie Canal, and the Great Lakes. The initial capitalization is \$250,000, which will be used for the construction of 50 canal boats, eight of which will be equipped with motive power, the remainder being consort, to be operated between Buffalo and New York. Increased capital will be provided later to establish a line of freight steamers between Buffalo and Chicago in connection with the canal service and to erect warehouses at Chicago, Buffalo, New York, and cities along the Erie Canal, where freight will be handled. Marcus H. Tracey, New York, is president, and Mayor William H. Follette, Tonawanda, N. Y., the most extensive operator of boats on the Erie Canal, vice-president. The boats for canal service will be built at Mayor Follette's boat building plant in Tonawanda and will be ready for operation with the opening of the season of 1910. The Simmons Transportation Company of New York is largely interested in the new company.

THE IRON AGE

Established in 1855.

New York, Thursday, June 24, 1909.

Entered at the New York Post Office, as Second Class Mail Matter.

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RICHARD R. WILLIAMS,	-	-	-	-	-	
						HARDWARE EDITOR.

Improving the Efficiency of Negro Common Labor.

We are, we believe, committing no breach of etiquette when we refer to some remarks made at a recent private gathering of steel makers, because they came from a source which would command attention throughout the country and deal with a subject of vital significance. The speaker, himself a Southern man, is one of the younger captains of the iron industry and is at the head of one of the largest undertakings in the South. He spoke frankly of the most serious problem in the development of the enormous natural resources of that section of our country, that of colored labor. In origin and in characteristics the negro is as much a varied race as the common white labor of our Northern and Western States, a fact which is not as fully and as generally realized as it should be. In traits and capacity the man of African origin differs as widely as the Swede differs from the Pole or Italian. Yet whatever his origin the negro possesses one common characteristic, that of unwillingness to labor longer than is required to meet immediate and pressing necessities. A very large percentage of the common negro laborers will not work to accumulate possessions or to provide for the future. Living entirely from hand to mouth, the negro does not create for himself or for the community the amount of wealth which he should, so that the accumulation of surplus and of capital in the South has not proceeded with the rapidity which opportunity and natural resources would seem to justify.

The remedy lies in patient, persistent effort of the white man in educating the negro laborer to become more ambitious and to learn thrift and foresight. One of the means toward that end which has been started with fairly encouraging results is to induce the negro laborer to acquire the habit of saving a surplus. It is in work along such lines that those who are employers of negro labor can most effectively promote their own interests and do lasting good to the South and to the whole country.

Facts About Rail Failures.

It is early to generalize concerning the improvement in track due to the specifications for steel rails under which the mills have worked in the past 18 months. Some of the comments on the statistics recently given out by the New York Public Service Commission illustrate the danger of interpreting statistics without taking into account collateral facts. The total number of reported

rail failures on New York steam railroads in the four months, December to March, inclusive, in the winter 1907-1908, was 3917, and for the same period in 1908-1909 the total was 1829. The "revision of the methods of manufacture" is credited with much of the reduction in breakages. That is about as competent a statement of the case as was given in some of the attacks on the rail mills in 1907. Several suggestions are admissible: In the first place comparatively few new rails were laid in 1908 in New York State—perhaps about half as many as in the previous year. As in many cases the structurally bad rails break early in service, the failed rails attributable to poor steel might be expected to run about half as many in 1908 as in 1907. Of rails breaking because of defects which require time and severe service for their development, the failures last winter must be credited to the old régime. In the third place, the average temperature in New York State in the winter of 1908-1909 was much above that for the winter of 1907-1908. The bearing of this fact may be inferred from the marked falling off last winter in breakages on those lines having the longest stretches of track along the higher parallels of latitude.

That some part of the better showing made last winter is attributable to better rails laid in 1908 than in 1907 is undoubted. The New York Central lines, for example, by the payment of a higher price secured stronger, tougher rails for portions of its track, as already told in these columns. But it is well to sift the facts, in comparing present and former practice in rail mills, in the light of track results, and fortunately the improvement in the making of records of rail failures will contribute not a little to the drawing of discriminating conclusions.

Compulsory Working for Patented Parts Only.

The British patent law, requiring the compulsory working of patents on penalty of revocation, has been threshed out in various suits for annulment until certain basic principles of interpretation have been established. One of much importance to American inventors who wish to protect their patents in Great Britain is that compulsory working applies only to such parts of a mechanism as are specifically described and claimed either in themselves or in combination with other well-known parts. The entire machine need not be built in the United Kingdom. If the portion covered by the patent is produced there the remainder may be shipped from another country. If the patent claims include a combination with other parts it may be necessary at least to assemble the entire machine in the United Kingdom. Under this interpretation of the law the home manufacture of many American products will be less affected than was at first supposed.

The principle is important not only in deciding to what extent it is necessary to manufacture in Great Britain, but also in governing inventors in the wording of their claims for future British patents. The less included in the patent the more can be produced in the United States. It sometimes happens that claims are needlessly exhaustive. This has done no harm in the past, but might complicate matters under the British law, and in other foreign countries which may put their compulsory working clauses into more vigorous action.

Engineering, in discussing the results of recent cases of revocation of patents, emphasizes the principle as established by saying that "patentees must carefully construe their claims and see that all mechanism or parts specifically described and claimed are manufactured here (in the United Kingdom). They do not appear to be

required by the act to manufacture mechanisms or machinery not specifically described or claimed. If this general principle is correct—and we do not see that it can be otherwise—it would seem to follow that if a patentee has claimed a wholly new mechanism or machine he must manufacture that in this country; but if he has only claimed an improvement in a known machine, he must manufacture the improvement—not necessarily the whole machine. A patentee may have claimed the improvement in combination with a machine consisting of well known parts, and it would therefore seem that he must manufacture the improvement and must assemble the whole in this country, or, at any rate, the combination he claims. Different questions will no doubt arise from time to time, and each case will have to be decided on its merits and will have to be determined on a proper construction of the patentee's specification, what the patentee's invention really is, and what are its essential features. Patentees must therefore carefully consider their specifications."

An increasing tendency to disregard patent protection appears in foreign countries. Basic inventions are always worth establishing everywhere, and their owners seldom fail to avail themselves of every possible protection in all countries. But when it comes down to minor improvements and refinements, or to inventions consisting of combinations of old mechanisms, many inventors and manufacturers hesitate to go to the trouble and expense attending foreign protection. Experience has shown that in many cases the publication of patent details may be made useful to competitors abroad in the suggestion that they carry with them. Engineers can often avoid the patented provisions by accomplishing the same end in some other manner. Then, too, there is a widely prevalent belief that American inventions patented in foreign countries, especially on the Continent, are freely used by competitors there, who trust to immunity from prosecution, either from failure of discovery or from a hesitancy to engage in costly litigation in foreign courts. The fact that compulsory working will hereafter be insisted upon in a serious way may prove another strong motive for confining patent papers to this country, keeping competitors out of the home market, and trusting by superior methods of manufacture and a better application of the principles involved to win a field for the product abroad, in the face of the use of the invention by others. In a great many cases such a policy is a poor one. Anything which reduces the onus placed on the inventor by foreign laws, such as the principle under discussion, should help to abate the apparently growing custom of Americans to disregard the advantages of the patent conventions.

The Export Trade in Iron and Steel.

British iron and steel exports have shown a decrease this year from those of 1908, while both Germany and the United States have shown an increase. German iron and steel exports in the first four months of this year total 1,224,923 tons, against 1,161,051 tons in the first four months of 1908, showing an increase of 5.5 per cent. A comparison between the export trades of the United Kingdom and the United States is more interesting, since while these trades differ greatly in point of tonnage they are more similar in character.

Taking the totals for each country in 1907 and 1908 and computing the rates in 1909 from the totals thus far this year, for the first four months in the case of the United States and the first five months in the case

of the United Kingdom, the following comparison is made:

Iron and Steel Exports.—Gross Tons.		
	United States.	United Kingdom.
1907.....	1,301,979	5,311,993
1908.....	964,266	4,233,956
1909*.....	1,051,116	4,124,510

* Estimated.

In the case of the United States there is a decrease of 25.9 per cent. from 1907 to 1908, but an increase of 9.0 per cent. from 1908 to 1909. With the United Kingdom there is a decrease from 1907 to 1908 of 20.3 per cent. and a further decrease from 1908 to 1909 of 2.6 per cent.

Noting that the decrease from 1907 to 1908 was greater with the United States than with the United Kingdom, it might be surmised that the gain in 1909 over 1908 for the United States was merely the making up of the greater amount of ground lost; but such is not the case, for with the United Kingdom the 1909 exports are 22.3 per cent. below those of 1907, while with the United States the decrease is only 19.3 per cent.

The change in industrial conditions from 1907 to 1908 was so stupendous that the statistics of exports were awaited with unusual interest. The buoyancy of the trade at its top notch of prosperity had made it easy to surmise that whenever domestic demand should fall off an increase could be made in exports, but, as might have been expected, the depression when it came proved to be world-wide and exports were necessarily reduced. Indeed, had the trade been in a different mood, it might with as much reason have feared that by reason of the newness of the United States as an exporter of finished steel products it might suffer much more than other countries when the export market became quiet. The result lay between the extremes, the United States suffering about as much in its export trade as did the other exporting countries.

So far as the domestic market in the United States is concerned, it has been obvious that the extreme decline in demand was experienced at the beginning of the depression, the minimum being passed in the first half of last year. Our monthly pig iron statistics indicated that conclusively, each month after June, 1908, showing an increased rate of output until last March was reached. The exports of the three great countries have shown no such change, the total exports this year being only slightly greater than the average rate of 1908, and what is striking is that this year the United States is showing heavier exports while the United Kingdom is showing a further decline.

The changed character of our iron and steel exports can hardly be mentioned too often. Years ago they were largely in the nature of dumping, and the public, perhaps in particular that portion of the public which is in political life, does not fully realize that dumping is practically a thing of the past. The export trade of the United States is not entirely in a class by itself, but depends chiefly upon the demand, much as do shipments to Texas or Minnesota. It has features just as the domestic trade has features. Last year the domestic trade saw a great decrease in the demand for steel plates for car shops, while the decrease in tin plates for can makers was very slight, and thus in branches of the export trade there are variations from time to time.

While British iron and steel exports seem to cast those of the United States quite in the shade, having averaged more than four times as large, the comparison in finished products does not show nearly as great a preponderance for the older country. While Great

Britain exports pig iron very heavily we export an insignificant tonnage, although, such are the mutations in this trade, it was largely in pig iron that we made our reputation for dumping back in the nineties. More than one-fourth of the British exports in the first five months of this year were pig iron, while our pig iron exports have not been more than 5 per cent. of our total.

Deducting the British exports of 67,106 tons of old iron and steel and 436,327 tons of pig iron, the remaining exports in the first five months of this year totaled 1,215,113 tons, or at the rate of 2,916,271 tons a year. In the case of the United States there are to be deducted for the first four months 6679 tons of scrap and 17,342 tons of pig iron, leaving 326,351 tons, or at the rate of 979,053 tons a year. Our iron and steel exports, outside of pig and scrap, have been fully one-third as large as the British exports, although taking the grand total the proportion is more than four to one.

The Iron Ore Reserves of the United States.

The Holdings of the Steel Corporation.

Joseph G. Butler, Jr., of Youngstown, Ohio, has submitted to Nelson W. Aldrich, chairman of the Finance Committee, a supplemental report regarding iron ore, which grew out of his hearing in the Senate gallery several Senators remark that the United States Steel Corporation owns 85 per cent. of all the iron ore in the United States. This led him to collect additional data, his first step being to employ John Birkinbine of Philadelphia, whose position as an authority on the iron ore resources of this country and the economic conditions surrounding them need not be referred to in the columns of *The Iron Age*. Mr. Birkinbine's report is a clear, comprehensive review of the available resources, and is thoroughly conservative. We regret that we cannot at this time present more than

Mr. Birkinbine's Estimates of Reserves:

The foregoing will indicate that the reserves of iron ore in the Lake Superior region, of material such as is now shipped, exceed 1,600,000,000 tons, and that this amount may be greatly augmented by the utilization of some ore not now classed as desirable.

That in the Adirondack District of New York the ore reserves amount to 125,000,000 tons, which may be supplemented by 25,000,000 tons of other New York ores and the possibility of large future additions from the deposits of Clinton ores in the center of the State.

That New Jersey has over 35,000,000 tons of available ore, and in addition 100,000,000 tons of concentrating ore can be obtained.

That Pennsylvania has reserves amounting to 45,000,000 tons, which may be increased by liberal exploitation of Clinton and carbonate ores.

That the Southern States may be counted on for a supply exceeding 1,200,000,000 tons, and possibly a much larger amount.

The reserves in the Rocky Mountain region and west of this, tentatively estimated as 100,000,000 tons, cover but a small part of the producing territory.

That the New England and other Atlantic States and the Central States, including Indiana, Illinois, Iowa, Mississippi, Missouri, Arkansas and Texas will further add to the reserves.

Mr. Butler calls attention to the

Eastern Magnetites

and makes the point that on account of the electric concentrating process the Lake Champlain and Adirondack districts are rapidly forging to the front. He expresses the belief "that the output of these mines, together with the ores produced by the concentrating process in New Jersey, will in time equal the shipments from Lake Superior." We question whether in his fondest dreams any one associated with the operations of Eastern magnetite deposits has ever ventured to hope for so magnificent a future.

Mr. Butler submits for comparison with Mr. Birk-

inbine's estimate the figures compiled by G. Willard Hayes of the United States Geological Survey, who reaches a total of 4,788,150,000 gross tons of "available" ore, which includes those ores which can be worked at a profit under present conditions, and 75,116,070,000 gross tons of "not available" ores, which includes all ores which cannot be worked at a profit under existing conditions.

Mr. Butler cites an interesting letter from James M. Swank, the veteran manager of the American Iron and Steel Association, and takes up the discoveries of ore in Cuba, quoting the prospectus of Henry & West and the accompanying letter of E. C. Felton in regard to the Mayari developments of the Spanish-American Iron Company. Mr. Butler ventures the prediction that "within 10 years not less than 10,000,000 tons per annum of these Cuban ores will be imported and consumed on the Atlantic Coast."

A highly interesting statement is what is an official estimate of

Steel Corporation Holdings,

which was furnished to Mr. Butler by officials of the United States Steel Corporation, with authority to make such use of as he might see proper. The figures are:

	Ores of present standard com- mercially.	Silicious and other low grade ores.	Total.
	Gross tons.	Gross tons.	Gross tons.
Northern ores:			
Totals	1,258,289,000	365,845,000	1,624,134,000
Southern ores:			
Totals red and brown	459,300,000	239,000,000	698,300,000
Totals	1,717,589,000	604,845,000	2,322,434,000

From all the data collected the report closes with the following, as

Mr. Butler's Conclusions,

his estimate of ores of the present commercial standard, available in the immediate future being:

	Tons.
Lake Superior.....	1,618,000,000
New York.....	750,000,000
New Jersey.....	135,000,000
Pennsylvania	45,000,000
South	1,814,940,000
Rocky Mountain District.....	100,000,000
Total	4,462,940,000

"Taking the figures of the United States Steel Corporation of the 'available' ores, to wit: 1,717,589,000 tons, it would appear that the Corporation owns 38½ per cent. of the available, desirable ores.

"Figuring all the iron ore of all kinds, 'available' and 'nonavailable,' amounting to 79,186,000,000 tons, and figuring that the United States Steel Corporation—according to its figures—owns 2,322,434,000 tons of the whole, the actual percentage of iron ore in the United States owned by the United States Steel Corporation is 2.9-10 per cent., or, in round figures, 3 per cent. of the whole, instead of 85 per cent., as claimed by certain United States Senators."

We must confess that composite estimates of this character and the conclusions from them are not very convincing, because the different reports upon which they are based differ too widely to permit of making convenient selections. To the mining engineer and the iron maker those estimates carry most weight which are put forward cautiously and with reserve, and from that point of view the figures presented by Mr. Birkinbine are most convincing. They are lower for the lake ranges, including all properties, than are the official estimates for the Corporation mines alone.

We have never been able to share the scare over the exhaustion of our iron ore resources, even at the progressive rate of output, nor the fright over the control by the Steel Corporation of the available ores. The danger to coming generations of iron makers lies more in the excessive valuation of iron ore property at this time, with its heavy burdens of carrying charges and interest, ultimately to be added to cost, or written off by liquidation. The history of the anthracite coal industry with its past sufferings and present load of charges should convey an eloquent warning to the iron industry.

PERSONAL.

George Powell, president of the International Protective Association of Tin Plate Workers, has resigned, after a service in that office of 12 years. The National Executive Committee has the matter of a successor under consideration.

Geo. L. Wall, mechanical engineer of the Lima Locomotive & Machine Company, Lima, Ohio, has assumed the duties of assistant general manager.

J. C. Temple has opened an office for the S. Morgan Smith Company, builder of McCormick turbines, in the American Trust Company's Building, Chicago.

F. J. Jumper of the Union Pacific Railroad's motive power department has accepted the position of mechanical engineer of the McKen Motor Car Company, Omaha, Neb.

J. B. Clark, who for five years has been superintendent of the Bessemer and billet mills of the American Steel & Wire Company at Newburgh, Cleveland, has been appointed general superintendent of the company's Schoenberger works at Pittsburgh.

C. H. Moyer, manager of the New York office of the George V. Cresson Company, Philadelphia, has returned from a six weeks' visit to Europe in the interest of his firm.

Paul Willis of the Kenwood Bridge Company, Chicago, has succeeded F. W. Barker as president of the company and has been succeeded as secretary and engineer by A. J. T. Bennett.

Hugo Reisinger of New York has gone abroad.

Dr. W. H. Tolman, director of the American Museum of Safety and Sanitation, sails next week. He will deliver an address before the International Medical Congress at Budapest in July.

We were in error in making the announcement in the issue of *The Iron Age* of June 10 that Edward V. d'Inville, mining engineer of Philadelphia, has sailed for Europe. Mr. d'Inville had been abroad for five months and returned home on June 7.

Charles M. Schwab, president of the Bethlehem Steel Company, has returned from Europe.

George W. Schleuderberg, general manager of the Pittsburgh Coal Company, will retire from that position on July 1. He will spend some time in travel. He was one of the founders of the company.

John Baxter, formerly in the pipe department of the La Belle Iron Works, at Steubenville, Ohio, has been appointed general superintendent of the new pipe mill to be erected by the Republic Iron & Steel Company at Haselton, Ohio.

Naval Architects' and Marine Engineers' Meeting.

At the summer meeting of the Society of Naval Architects and Marine Engineers, to be held at Detroit, Mich., June 24 to 26, the following papers will be presented: "Some Model Experiments on Suction of Vessels," by Naval Constructor D. W. Taylor, U. S. N.; "A Method of Determining Pressure for Steam Turbines," by Prof. C. H. Peabody; "The Resistance of Some Full Types of Vessels," by Prof. C. H. Sadler; "The U. S. S. Michigan Renamed the Wolverine," by Commander W. P. White, U. S. N.; "Shallow Draft Steamers," by Charles Ward; "Material Handling Arrangements for Vessels on the Great Lakes," by Alexander E. Brown; "The Strength of Knees and Brackets on Beams and Stiffeners," by H. R. Hunt, and "Towing Problems," by T. S. Kemble.

New Construction on the Pennsylvania Lines.—C. W. Cushing, Pittsburgh, chief engineer of maintenance of way, P., C., & St. L. Railroad (Pan-Handle), Pennsylvania lines west of Pittsburgh, will award contracts within the next week for 75 miles of double tracking of the company's lines between Union City, Ind., and Lo-

gansport, Ind. The contract is to be awarded in seven sections. The company will also receive bids at the same time for 18 miles of new road near Richmond, Ind., the work to include 46,000 cu. yd. of concrete construction and approximately 2,000,000 cu. yd. of excavation. The structural material for bridges, the rails, track supplies, railroad ties, &c., will be awarded in separate contracts. The cost of the above work will run upwards of \$5,000,000.

OBITUARY.

E. P. WATSON.

After a lingering illness, E. P. Watson died at his home in Elizabeth, N. J., on the 22d inst. Mr. Watson was born in New York on April 17, 1835, and was identified with mechanical and naval engineering all his life. He was a frequent and forceful writer, contributing to many technical journals on professional matters. In 1881 he founded the *Mechanical Engineer* and conducted it for 16 years. For a number of years, until illness overcame him, many of his contributions appeared in the columns of *The Iron Age*.

FRANK M. CAMPBELL, for about five years district manager of the Philadelphia office of the Jones & Laughlin Steel Company, Pittsburgh, shot and killed himself at Van Wert, Ohio, on Monday morning, June 21. He had been suffering for several months from a nervous breakdown and had gone with his wife and three children to Mrs. Campbell's former home at Van Wert for a rest. Mr. Campbell was born in Clinton Pa., 46 years ago, but spent most of his life in Pittsburgh. He was employed for several years by the Park Steel Company, but left that company to go with the Jones & Laughlin Steel Company some 15 years ago. He was connected with its Pittsburgh offices for nine or ten years. Mr. Campbell was widely known among iron and steel men and was extremely popular. He had the reputation of being a tireless worker, and stood high with his employers.

GUY C. BARTON, ex-president of the American Smelting & Refining Company and one of its organizers, died June 15, near Omaha, Neb.

SAMUEL WILSON MURRAY died at Milton, Pa., June 16, aged 80 years. He established a number of industries, including the Milton Car Works and the Milton Iron Company. He was connected in his early business career with the Portland Locomotive Works, Portland, Maine, and the Baldwin Locomotive Works of Philadelphia.

JOSEPH PORTER, president of the Peck Bros. & Co., New Haven, Conn, manufacturer of plumbers materials, died on June 8.

ROBERT J. GRAY died June 12 in New York City aged 83 years. Before the war he was engaged in the manufacture of engines and boilers in New York, and built several gunboats and revenue cutters for the Government.

MADISON H. HALL, for many years in the iron and steel business in St. Louis, died suddenly June 18, in that city, aged 73 years. He located in St. Louis about 30 years ago as resident manager for Park Bros., manufacturers of crucible steel. He afterward engaged in the manufacturing business in Wheeling, W. Va., and Madison, Wis.

THOMAS P. HEALY, New England agent of the International Heater Company, with office in Boston, died at Chelsea, Mass., June 13, in his 55th year.

JACOB BENDER of the firm of Philip J. Bender & Sons, machinists, New York, N. Y., died in Yonkers, June 18, aged 50 years.

The annual booklet giving complete average cargo analyses of Lake Superior iron ores for the season of 1908 and, in the case of new ores, the expected analyses for the season of 1909 has been issued by the Lake Superior Iron Ore Association. The office of the secretary, William B. Treat, is in the Rockefeller Building, Cleveland.

Metal Schedule Changes.

Slight Amendments in the Senate—The Iron Ore Duty.

WASHINGTON, D. C., June 22, 1909.—President Taft's message to Congress recommending a tax on the net earnings of corporations and suggesting the passage of a joint resolution submitting to the States an amendment to the Constitution clothing Congress with authority to levy an income tax has upset all calculations concerning the passage of the pending tariff bill. The action of the President is apparently in accord with the plans of the Senate leaders; in fact, as stated in this correspondence last week, the proposition for a tax on corporate incomes has been brought forward by Chairman Aldrich of the Finance Committee as a substitute for the unpopular tax on the incomes of individuals and corporations contemplated in the amendments heretofore offered by Senators Bailey of Texas and Cummins of Iowa. A suspicion appears to be entertained in some quarters that the purpose of the Senate leaders is to use the corporate tax project merely to defeat the general income tax amendments and then to abandon it, either in the Senate or in Conference Committee. The leaders assert, however, that their championship of the new measure is in good faith. Whatever may be the outcome, it is the best opinion here that the controversy thus injected into the tariff debate will prolong discussion for several days and final adjournment before July 15 at the earliest seems improbable.

Changes in Metal Schedule.

Several minor changes in the metal schedule have been made during the past week at the instance of Chairman Aldrich of the Finance Committee. With a view to increasing slightly the protection on nippers and pliers the Senate has adopted the following new paragraph:

194½. Nippers and pliers of all kinds, except blacksmiths' tongs, surgical and dental instruments or parts thereof, wholly or partly manufactured, 10 cents per pound and 40 per cent. ad valorem.

Blacksmiths' tongs, surgical and dental instruments or parts thereof, will pay 45 per cent. under the new law, or a rate slightly less than that levied on nippers and pliers.

For the purpose of reclassifying band and strip steel used in the manufacture of saws, which in one form and another and at various rates of duty, is provided for in several different parts of the metal schedule, the Senate on Senator Aldrich's motion has amended paragraphs 122, 129, 134 and 136 of the Finance Committee bill, as given in *The Iron Age* of April 15, pages 1202, 1203. The modifications do not increase the duty in any case; but, on the contrary, make slight reductions. The principal change in paragraph 122 consists in adding at the end the words "bands and strips of steel 12 ft. in length, not specially provided for in this section, 35 per cent. ad valorem." In paragraph 129 the words "steel band, circular and other saw plates, wholly or partially manufactured" are stricken out. In paragraph 134 the words "twenty-five one-thousandths of one inch thick, or thinner, made from wire or steel wire rods" are stricken out, and the words "not thicker than No. 15 wire gauge and not exceeding 5 inches in width" are inserted in lieu thereof, and the rate of duty on the articles covered by the first proviso of the section is reduced from 40 to 35 per cent. ad valorem. In paragraph 136 the word "saw" being the next to the last word in the paragraph is stricken out from the following: "And on steel circular saw plates there shall be paid one-fourth of 1 cent per pound in addition to the rates provided in this section for steel saw plates."

Senator Beveridge of Indiana has introduced an amendment reducing the rate on cash registers from 30 to 15 per cent. ad valorem. In support of this proposed modification, he states that the National Cash Register Company of Dayton, Ohio, has acquired a practical mo-

nopoly of the business and is selling its goods abroad at about one-half the prices charged in the United States. After a brief discussion of the amendment, which was strongly opposed by Senators Burton and Dick of Ohio, it went over for future consideration.

Higher Duties on Galvanized Sheets.

Notwithstanding the opposition to further increases in the rates of the metal schedule as fixed in the Senate bill, efforts are still being made to raise certain duties, and champions are being found for the desired increases among the most conservative and influential of the Republican Senators. Senator Burton, of Ohio, who is regarded as closer to the administration than any member of the Senate, has introduced an amendment increasing the rates on galvanized iron and steel sheets, plates, &c., from 2-10 to 4-10 cent per pound additional, paragraph 126 as thus amended reading as follows:

126. All iron or steel sheets or plates, and all hoop, band or scroll iron or steel, excepting what are known commercially as tin plates, terne plates and taggers tin, and hereinafter provided for, when galvanized or coated with zinc, spelter or other metals, or any alloy of those metals, shall pay four-tenths of 1 cent per pound more duty than if the same was not so galvanized or coated; sheets or plates composed of iron, steel, copper, nickel or other metal with layers of other metal or metals imposed thereon by forging, hammering, rolling or welding, 40 per centum ad valorem.

This amendment is understood to have considerable strength behind it, as other senators contemplate asking for increased duties, and "log rolling" is therefore in prospect. While these amendments may be offered and urged up to the last moment before the bill is finally voted on in the full Senate, the outlook for any general increase in the duties of the metal schedule is far from encouraging to the promoters of this movement.

Iron Ore Duty in Conference.

The fact that the tariff bill will be sent to conference before many days is causing renewed activity on the part of the advocates and opponents of the duty on iron ore, which was removed by the House and restored by the Senate at the rate of 25 cents per ton. This item promises to be one of the storm centers of the conference, especially in view of the action of no less than 18 of the 31 Democratic senators in voting for the duty and the further fact that many Democratic members of the House who voted for free ore are now hopeful that the Ways and Means Committee will yield the point and agree to the Senate rate.

Senator Paynter of Tennessee, one of the Democrats who voted for the ore duty, is laboring hard for its retention, and has been at much pains to gather data calculated to induce his Democratic colleagues in both houses to support the ore duty in the interest of the so-called independent manufacturers. In a statement made on the floor during the past week Senator Paynter declared that so far as he was concerned he would prefer to see the duty that would be collected on iron ore go into the Treasury than to see its equivalent "go into the pockets of the manufacturers," as it would certainly go if ore were admitted free. He added: "No mathematician or statesman can show, by figures or otherwise, that the consumers would be able to buy the product of the iron manufacturer at a price that would save them the amount of duty paid on the iron ore from which it was produced. The manufacturers would be the gainers to the extent they did not pay a duty on iron ore, and the taxpayers would be compelled to make good the loss in the revenues."

Views of Independents on Ore.

In support of his contention that the independent manufacturers are more or less dependent on the duty on ore and that the United States Steel Corporation is really not interested in the duty, Senator Paynter has made public a letter received from J. G. Butler, Jr., of Youngstown, Ohio, in part as follows:

The independent iron ore interests which I represent believe that the duty of 25 cents per ton as fixed in the Senate bill is fair and equitable, and it meets with the approval of all the independent producers of iron ore and more than 90 per cent. of the manufacturers of merchant pig iron. I consider, and the independent interests I represent believe, that it is incon-

sistent for the manufacturers of iron and steel in this country to ask and insist upon iron ore coming in free of duty and at the same time insist on their finished product bearing duty.

The assertion has frequently been made in the United States Senate that the United States Steel Corporation owns 80 per cent. to 85 per cent. of the iron ore in the United States. This statement is absolutely untrue, and I am hoping to be able to send you within a very few days a statement showing as nearly as it can be estimated the amount of available ore by districts in the United States and the ownership therein of the United States Steel Corporation. I can say frankly now that in my judgment the United States Steel Corporation owns not more than 25 per cent. of the iron ore in the United States.

Rates on Ore and Scrap.

In his search for information as to the attitude of the independent producers with respect to the ore duty, Senator Paynter requested Rogers, Brown & Co., Cincinnati, engaged in the iron commission business, to advise him as to the effect of free ore on the industry and has received a reply in part as follows:

It has been expected that the tariff would be reduced, and the iron men generally of the country have conceded that a cut of 15 cents per ton, from 40 cents down to 25 cents, could be made without serious detriment to the mining interests of the United States, and at this figure during the coming years the revenue to the Government may possibly be increased somewhat. There seems to be an impression that any duty retained on ore will inure to the special benefit of the Steel Corporation, and that the independent interests of the country might be helped if the duty was entirely removed. The fact is, however, that during recent years the independent companies have made the bulk of the pig iron. They have their own ore properties and have put up many millions of dollars to develop them so that they would have sources of supply.

The furnace companies in which we are interested, with 10 different stacks located in Illinois, Ohio, New York and Pennsylvania, formed a company some time ago with \$1,000,000 capital, and since then have formed another with \$300,000 capital, for the purpose of developing mines in the Lake Superior District. The Empire Steel & Iron Company, in Pennsylvania, of which the writer is a director, owning eight blast furnaces, has spent a large amount of money also in developing local ore mines for its own use, and what we have done has been done by other blast furnace people on a large scale. While the Steel Corporation may be benefited by a duty on ore, its position is such that we believe it can do business at a profit at prices which would put the rest of us out of the running, and it is in behalf of the independents that we are writing you.

So far as we are able to learn, free ore might help a few of the steel plants that have blast furnaces located on the seaboard or in the extreme East, which would draw their supply from Cuba and other points where they could get their mining done at prices for labor impossible in this country. If reports are true these parties can well afford to pay a duty of 25 cents per ton on the ores they may bring in from Cuba and Spain, and the Government, we believe, is justly entitled to that amount of revenue from the ore imported. There is certainly no reason why the United States should foster and help develop mines in other countries and by so doing either shut down the mines here or force a radical cut in wages. We believe that a duty on ore is a legitimate means of raising money to help pay the expenses of the Government, and that it is a tax that is borne in a very slight degree, if at all, by the workmen of this country, while to the extent that it increases our mining interests at home it is a direct benefit to the working classes.

There has been considerable discussion about reducing the rate on imported scrap down to 50 cents per ton. This has apparently been brought about by the efforts of a comparatively few consumers in the East, who get protection on their manufactured output, but who desire to get their so-called "raw material" free. We believe that an investigation of this subject will convince you that as scrap is used in the place of pig iron it should bear the same rate of duty that may be fixed on pig iron, which we trust will not be less than \$3 per ton.

On the strength of the campaign in favor of an ore duty that has been made since the tariff bill reached the Senate, the claim is now made that a majority of the Democrats of the House will favor the duty and to that end will co-operate in an effort to cause a separate vote to be taken on this item.

Domestic and Export Prices.

The admission, very frankly made by prominent Republican senators, that manufacturers frequently sell their products abroad at less than domestic prices, has stimulated the minority senators to attack the duties of the metal schedule on the ground that they enable producers to exact high prices at home while selling their goods abroad at materially lower figures. Senator Overman, of South Carolina, has laid before the Senate a table showing the alleged difference between export and home prices of certain specified articles. Angur bits (Irwin's solid center) are said to be sold for export at

from \$1.30 to \$2.92 per dozen as compared with \$1.80 to \$4.05, an excess of 39 per cent. in the domestic over the export price. Bolts of various kinds are said to be sold in the home market at from 17 to 25 per cent. higher prices than those secured for export.

Other items in Senator Overman's list, together with the alleged excess charged on domestic sales over certain export prices, are given as follows: Nicholson's files, mill and round bastard, 27 to 60 per cent.; flat bastard, 19 to 98 per cent.; square, 20 to 102 per cent.; Disston's gauges, 12 per cent.; harness snaps, from 33 1/3 to 39 per cent.; Stevens' rifles, from 18 to 30 per cent.; Disston's saws, from 27 to 65 per cent.; screws, flat head, round, wood, 97 1/2 to 115 per cent.; flat head, brass, wood, 89 to 151 per cent.; round head, iron, wood, 66 to 156 per cent.; round head, brass, wood, 106 to 194 per cent.; Armstrong's vises, 25 to 122 per cent.; wrenches (Hawkeye), 25 per cent. Senator Overman also claims that in many cases goods are sold for export from the same price-lists as for domestic consumption, but on the basis of additional confidential discount.

New Rates for Zinc.

No feature of the metal schedule has proved more difficult of adjustment than the rates on zinc ore and zinc products provided for in paragraphs 190 and 191. Zinc ore has been held by the courts to be free of duty under the Dingley act, although the framers of that law undoubtedly intended to provide it with a measure of protection. The House gave the ore a duty of \$20 per ton, but at the same time reduced the Dingley rate on spelter and other zinc products from \$30 to \$20 per ton. When the bill reached the Senate the zinc smelters demanded a differential between the rates on ore and spelter, and the leading Eastern concerns insisted that the ore should not be taken from the free list, asserting that if companies operating both mines and smelters in New Jersey could get along without an ore duty no duty could possibly be required by producers in Missouri, Arkansas and other interior States. The subject has been threshed over at great length by the Finance Committee and a graduated scale of duties on ore based on metallic content has finally been reported to the Senate and adopted by that body, as follows:

190. Zinc-bearing ore of all kinds, including calamine, containing less than 10 per cent. of zinc, shall be admitted free of duty; containing 10 per cent. or more of zinc and less than 20 per cent., one-quarter of 1 cent per pound on the zinc contained therein; containing 20 per cent. or more of zinc and less than 25 per cent., one-half of 1 cent per pound on the zinc contained therein; containing 25 per cent. of zinc or more, 1 cent per pound on the zinc contained therein.

The committee has also reported and the Senate has adopted modified rates on spelter and other zinc products as follows:

191. Zinc in blocks or pigs and zinc dust, 1 1/2 cents per pound; in sheets, 1 3/4 cents per pound; in sheets, coated or plated with nickel or other metal or solutions, 2 cents per pound; old and worn out, fit only to be remanufactured, 1 cent per pound.

It is regarded as probable that the Senate rates on zinc ore will be adopted by the House conferees, but that the duties on spelter and other manufactures of zinc will be slightly lowered.

W. L. C.

An extension of the electric system supplied by the plant at Harwood mines, Lattimer, Pa., is being planned by those in control of the property. They have asked for charters for five electric companies to operate in as many townships of Luzerne County, Pa., the intention being to transmit power from long distances. The men identified are Calvin Pardee, Alfred D. Pardee, Calvin Pardee, Jr., A. W. Drake and John S. Wise, Jr.

The merger of Boston's leading commercial organizations was completed last week; the old Merchants' Association, Chamber of Commerce, Board of Trade and several special business associations uniting as the new Boston Chamber of Commerce with a membership of 3000 and a sustaining fund of \$100,000 contributed by 200 business men. Ryerson Ritchie is executive director.

Standardizing Foundry Facings.*

BY H. F. FROHMAN, CINCINNATI, OHIO.

Nearly every foundry, whether producing large or small work, must use sea coal or bituminous facing. This is a ground coal, mixed with the sand to prevent it from fusing together, and at the same time peel the casting. Sea coal facing must be high in volatile matter, low in ash and sulphur. It must be known as a gas coal, and the most suitable coal should show approximately the following analysis:

	Per cent.
Moisture	1.40
Volatile matter.....	37.66
Fixed carbon.....	54.44
Ash	5.86
Sulphur	0.64

Not only should this coal be high in volatile matter and fixed carbon, but very low in ash and sulphur. It must also be ground to practically the same consistency as the molding sand used for the castings. In other words, for heavy work a rather coarse sand is used and the sea coal for this purpose should all pass through a No. 14 mesh. General or medium sized work, the sand being finer, would require a finer ground sea coal facing, all going through a No. 18 mesh. Small castings, such as stove plate and radiator work, requiring a very fine and rather close sand, call for a sea coal facing in accordance therewith, or one passing through a No. 32 mesh. There is also a sea coal facing which is termed "bolted," which is used for very fine ornamental castings requiring extremely sharp points. As this requires also a finely bolted sand in order to make a clean surface and not in any way disturb the face of the mold, it is necessary to have a bolted sea coal facing of practically the same fineness as the molding sand.

Facing Mixed with Sand.

Sea coal facing is used to mix with the sand to peel the castings, the proportions running from 1 part of sea coal facing to 10 to 30 of sand, depending upon the size of the castings. For what specific purpose the facing is mixed with the sand has not been fully decided upon, nor have our practical foundrymen or chemists given us a satisfactory reason yet why sea coal facing mixed with the sand will peel the casting. In the writer's opinion the facing thus mixed not only prevents the sand from fusing, but also vents the mold. It has also been suggested that a good grade of sea coal facing high in volatile matter forms a gas or cushion when the hot iron comes in contact with the mold, so that the molten iron does not come in thorough contact with the molding sand.

In our experiments we have molded brake shoes, using the same sands under the same conditions, mixing the sand 20 to 1 with following: 1, sea coal; 2, Ceylon plumbago; 3, charcoal; 4, anthracite; 5, sawdust—all of these different materials being ground to the same fineness as sea coal facing. The only good casting produced, where the iron did not burn into the sand, was from the mold made with sea coal facing. The Ceylon plumbago experiment indicates that it is not the separation of the sand particles by a medium preventing fusion. Sawdust contains more volatile matter than sea coal, but would not peel the casting. This disproves the cushion theory. The formation and following deposition of certain hydrocarbons may furnish a more plausible explanation. This theory does not question or exclude the beneficial effect of sea coal as a venting medium, or its influence in preventing a fusion of the sand by the separation of sand particles.

Plumbago.

In making castings, especially medium and large sized, something is required to face the mold—that is, to cover the pores of the sand so that the mold will practically have a smooth surface. The best article for this purpose is plumbago or graphite with a high percentage of graphitic carbon, the crystalline form from Ceylon giving the best results. This plumbago must contain a certain percentage of graphitic carbon, so that when the

molten iron is poured into the mold it will assist the iron to find its proper resting place, and be of such a refractory nature that the iron cannot cut into the mold itself. A good plumbago or blacking must not only have the proper chemical analysis, be so refractory as to prevent the hot iron from cutting into the mold, and also of such a nature that it will not retard the flow of the molten metal, but on the contrary assist it to glide along.

It has been found that plumbago of a high graphitic carbon is the most suitable for this purpose, not only in dry sand but in green sand work, and also for blacking cores. No doubt a high grade of plumbago makes the most suitable facing or blacking for producing a bright, clean casting. Ceylon graphite of high grade for facing purposes should analyze about as follows:

	Per cent.
Moisture	1.20
Oxide of iron.....	5.90
Aluminum	3.06
Lime	0.90
Silica	16.14
Graphitic carbon.....	72.80

The bulk of Ceylon graphite imported for foundry facings runs between 50 and 60 per cent. graphitic carbon. These are straight Ceylon graphites, not touched by the facing man. In the face of this fact an amusing instance may be mentioned here. We had made a shipment of straight Ceylon graphite showing 62 per cent. graphitic carbon to an Eastern firm. Their chemist was of the opinion that all Ceylon graphites analyzed 100 per cent. graphitic carbon. With great care he figured out to the third decimal how much of an inferior article we had added to the Ceylon plumbago, and we "got it."

Blacking.

The coke blacking used on certain classes of work should analyze:

	Per cent.
Fixed carbon.....	88.0
Ash	9.0
Sulphur	0.8

Anthracite blacking when used as a pipe blacking or mineral facing should show:

	Per cent.
Moisture	7.0
Fixed carbon.....	84.0
Ash	9.0
Sulphur	0.5

A good grade of charcoal facing which is generally used by the foundries, not only for parting purposes but also for foundry facing and as a core wash, should analyze:

	Per cent.
Volatile matter.....	10.0
Fixed carbon.....	85.8
Ash	3.7

the ash varying according to the kind of wood and time of cutting.

In judging a foundry facing such as graphite, coke, anthracite, charcoal, the carbon percentage should conform as near as possible to the above.

Pittsburgh-Buffalo Company Improvements.—The Pittsburgh-Buffalo Company, Pittsburgh, will soon begin extensive improvements at its Mariana, Pa., coal properties between the Agnes and Rachel shafts. The estimated cost is about \$1,500,000. One new building is a large brick structure to contain 1800 lockers, and is to be fitted with showers for hot and cold water, with other sanitary appliances. Such houses are used extensively in the mining districts of Germany, which representatives of the Pittsburgh-Buffalo Company inspected while abroad. A general store will be among the first new buildings erected. The 100 buff brick dwellings now occupied will be added immediately 100 double, eight and ten room houses, 25 three-room and 25 five-room. The mines have been running double shift, and additional housing accommodations have become imperative. Extensive additions will be made to operating appliances. Contracts have been let for 20 new air locomotives and compressors.

At present the Sharon Steel Hoop Company, Sharon, Pa., has no plans under way to add to its finishing capacity, reports that it would build sheet mills being untrue.

* From a paper prepared for the Cincinnati meeting, May, 1909, of the American Foundrymen's Association.

NEWS OF THE WORKS.

Iron and Steel.

The Shelby Steel Tube Company, Ellwood City, Pa., is building an addition, 100 x 300 ft., to its present mill building, solely for the purpose of adding more floor space under roof in order to handle its output to better advantage.

At Birmingham, Ala., a petition in bankruptcy was filed in the United States District Court, June 17, against the Woodstock Iron & Steel Corporation, Anniston, Ala., operating the Woodstock blast furnaces. The property was acquired by the Woodstock Iron & Steel Corporation in November, 1906. J. M. Barr, president of the company, and W. E. Leake were appointed receivers. The furnace which recently went out of blast has been under repairs. It is stated that the action for a receivership will enable the company to secure additional money to carry on the improvements. It is expected that the furnace will be in operation again in a short time.

A petition in bankruptcy has been filed against the Embreeville Iron Company, which owns a large acreage of ore lands in Green and Washington counties and an iron furnace at Embreeville, Tenn., which has been idle for several months.

R. C. Foster, Birmingham, Ala., doing a pig iron brokerage business as the R. C. Foster Company and operating a small rolling mill at Gadsden, has filed a petition in bankruptcy.

Howard H. Houston, receiver for the Tidewater Steel Company, Chester, Pa., will sell the plant at public sale August 3. The property will be sold in its entirety, and the purchaser will be required to deposit a certified check for \$25,000.

Hanging Rock Furnace, in the Ironton, Ohio, District, was banked June 18 for repairs.

The Pittsburgh Forge & Iron Company, manufacturer of hammered steel car and locomotive axles, marine and locomotive forgings, bar iron and similar products, is operating its plant, North Side, Pittsburgh, steadily. The company reports a general improvement in orders.

The Red River Furnace, Clarksville, Tenn., which had been idle for about three months, was blown in June 19 on high silicon iron.

The Republic Iron & Steel Company, Youngstown, Ohio, has let the contract for a new 10-in. mill to be added to the Brown-Bonnell Works at Youngstown, to the Morgan Construction Company, Worcester, Mass., and for a 20-in. mill for the same plant to the United Engineering & Foundry Company, Pittsburgh.

General Machinery.

The Benjamin Pulverizer Company, Atlanta, Ga., has been organized to place on the market the Benjamin pulverizer for grinding rock and clinkers for cement mills. Many advantages are claimed for this pulverizer, including less power to grind the material and smaller floor space. It will be manufactured in an existing plant. M. Benjamin is president; W. H. Walters, secretary and treasurer, and J. M. Benjamin, assistant secretary and treasurer. The president is also president of the Atlanta Machine Works.

A new garage and machine shop for the repair of motor cars, motor boats and stationary engines is to be built at Murphysboro, Ill., by H. C. Stagner.

In connection with the elevation of its belt line tracks in Buffalo, the New York Central Railroad will build an engine house, freight house and storage yard between French, Urban and Moselle streets, in the northeastern section of the city, to facilitate the handling of the freight traffic of the industrial plants now existing and to be established.

The Handian-Buck Mfg. Company, St. Louis, Mo., is to build a factory and warehouse, to cost about \$300,000. The plans embody an eight-story building covering a lot containing about 70,000 sq. ft.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., is operating about 75 per cent. of its capacity and business is increasing gradually. It is expected that before the close of the current year normal operations will have been reached. Full operations mean much larger earnings than several years ago, due to lower operating costs and a larger working capital. The cash balance of the company is said to be about \$11,000,000.

The Page Hervey Iron Tube & Lead Company, Toronto, Ont., Canada, has awarded contracts for the construction of a new rolling mill, furnaces, tunnel and machine shop at Welland to the Berlin Construction Company, Berlin, Conn., and the Duro-lithic Company, Buffalo, N. Y. The plant is to consist of a main rolling mill building, one story, 50 x 380 ft., with wing 80 x 150 ft., and a 10-ton crane and runway, 50 x 380 ft.; also a machine shop, one story, 35 x 180 ft. Construction of the buildings will be of steel frame and concrete.

Power Plant Equipment.

The Westinghouse Machine Company, East Pittsburgh, Pa., is doing a larger business in steam turbines and gas engines at present than at any time in the last two years. Contracts received so far this month include a 1500-hp. machine for the Stark Electric Company, Alliance, Ohio; 500-hp. engine, Goodyear Lum-

ber Company, Tomah, Wis.; 3000-hp. turbine, Nichols Copper Company, Laurel Hill, L. I.; 1500-hp. turbine, Utah Light & Railway Company, Salt Lake City, Utah; 5000-hp. turbine, Rochester, Syracuse & Eastern Railway, Lyons, N. Y.; 500-hp. turbine, Red Oak, Iowa; 5000-hp. turbine, Narragansett Electric Light Company, Narragansett, R. I., and a 1500-hp. turbine for the West Virginia Pulp & Paper Company, Covington, Va.

The citizens of Blackwell, Okla., have voted bonds for civic improvements which include \$30,000 for water works extensions, \$30,000 for an electric light plant, \$10,000 for city hall and fire department, and \$8000 for street improvements and sewer extensions. A. Sparks is city clerk and Burns & McDonnell, Kansas City, Mo., consulting engineers.

The Wisconsin Engine Company, Corliss, Wis., has received a contract for a tandem compound engine, 32 and 54 x 60 in., for installation in the new sheet plant of the Phillips Sheet & Tin Plate Company, at Hollidays Cove, W. Va. It is shipping to the Allegheny Valley Street Railway Company, Creighton, Pa., two 300-kw. cross compound engines, and to the Oliver Estate, Pittsburgh, two 1200-hp. cross compound and two 600-hp. single cylinder engines.

The Commissioner of Public Charities, New York, will receive bids until June 28 for two 250-hp. internal furnace boilers, for the power house at the Metropolitan Hospital, Blackwell's Island.

The Hooen-Owens-Rentschler Company, Hamilton, Ohio, builder of Corliss engines, steam turbines, heavy castings, &c., has received an order for a heavy duty tandem Corliss compound mill engine, direct connected to rolls operating at a speed varying from 140 to 175 rev. per min., as required for the different sizes of metal, in the upper mills of the Carnegie Steel Company, Youngstown, Ohio. It is building four large vertical triple expansion Hamilton Corliss purifying engines for the New York water works, with cylinders 28 x 50 in. and 60 x 80 in., having a daily capacity of 23,000,000 gal. of water. All cylinders are steam jacketed. The valve gear on the low pressure cylinders is of the poppet type.

E. H. Fisher, Colfax, N. M., is contemplating the construction of a power plant of 8000 hp. capacity on the Pecos River 14 miles east of Santa Fé, to transmit power to Santa Fé, Albuquerque and other cities. The plant, which will cost \$500,000, will consist of a diversion dam, nine miles of 72-in. pipe, one tunnel, power house and transmission system.

The Prosser Power Company, Prosser, Wash., is contemplating the construction of a new power plant $2\frac{1}{4}$ miles below the city, which will consist of two 500-hp. units, but which will eventually be increased to six units with a total capacity of 3000 hp.

Construction work will soon be begun upon a new electric line by the Cle Elum-Roslyn Railway & Power Company, Cle Elum, Wash. The proposed road will extend from Cle Elum to Lake Cle Elum via Roslyn, covering a distance of about eight miles. A power plant of 500 hp. divided into two units will be built at Cle Elum to provide power for the line. Frank S. Farquhar, Box 702, Tacoma, Wash., is interested in the project.

The Foos Gas Engine Company, Springfield, Ohio, which operates one of the largest plants in the country devoted exclusively to the manufacture of gas engines, reports considerably more business in May than that for the same month of last year. The month of April showed the largest business ever done by the company in a single month, and the business for the first five months of the year was much greater than has ever been done in any similar period. The company is adding to its facilities, anticipating a still larger increase in its business, and is working its plant to full capacity, 14 hr. per day. Catalogue K is the latest one issued.

The Fire Board of Baltimore, Md., has rejected bids for the boilers for the pumping station for the high pressure fire service, and new specifications will be drawn up and the contract re-advertised.

The Twin City Power Company, of which Thomas O'Connor is president, Waterford, N. Y., has begun construction work on its hydro-electric plant at Modoc, S. C., where 36,000 kw. will be developed at the start, to be increased later to 48,000 kw. The work will include a dam 60 ft. high and will cost about \$4,000,000. The construction work is in charge of the Ambursen Hydraulic Construction Company, Boston, Mass.

The receiver of the Gardner Convertible Steam & Gas Engine Company will offer for sale June 26 all the right, title and interest, together with the patent rights, franchises, &c., of the company, at Washington, Pa.

Foundries.

Thomas M. Brennen, formerly connected with the Keystone Steel Casting Company, Chester, Pa., has established a foundry, which will be operated under the name of the Eagle Crucible Steel & Brass Foundry. It is expected that the plant will be in operation next week, making steel, brass and gray iron castings.

The Twin Heat Stove Company has been incorporated at Lebanon, Ind., with \$50,000 capital stock, to manufacture stoves and do a general foundry business. The incorporators are W. W. Swain, N. D. Byram and E. E. Gates.

Bridges and Buildings.

The Wisconsin Bridge Company has been awarded contract for the construction of a 500-ft. steel bridge at Monmouth, Ill.

The Mackie-Crawford Construction Company, Jacksonville, Fla., has been incorporated to do bridge and structural steel erection work, to install heavy power and industrial machinery and to carry through engineering projects of various kinds.

The McCance Brothers Company, Inc., Pittsburgh, whose products consist of galvanized angles and shapes for bridges, buildings, &c., also galvanized hoops and bands and cross arm braces, reports that it is unusually busy and is operating its plant double turn in all departments.

The Des Moines Bridge & Iron Company, Des Moines, Iowa, and Pittsburgh, has taken a number of important structural contracts, as already reported. The department making cylindrical bottom water towers is also busy, one recent contract calling for a large tank of this type for shipment to the United States Government in the Philippine Islands.

Fires.

The recent fire at the plow manufacturing plant of B. F. Avery & Sons, Louisville, Ky., damaged the buildings to the extent of about \$25,000.

The factory of the Hardman-Peck Piano Company, at 628-640 West Forty-ninth street, New York, was destroyed by fire June 16, the loss being about \$100,000. The Harrington factory, across the street from the one destroyed, is owned by the company and will be used until arrangements can be made for additional factory space.

The plant of the Crown Drill Company, Phelps, N. Y., was burned June 19, the loss being about \$50,000.

The three-story concrete building of the Peninsula Mill Screw Company and the one-story frame structure of the Michigan Stamping Company, Detroit, Mich., were destroyed by fire June 16. The loss on the former is placed at \$75,000 and on the latter at \$30,000.

Hardware.

The Chicago Hardware Foundry Company, Chicago, Ill., has increased its capital stock from \$250,000 to \$300,000.

The Geneva Cutlery Company, Geneva, N. Y., has completed plans for a two-story brick factory, which will be built at once.

Miscellaneous.

The Follansbee Brothers Company, Pittsburgh, has been awarded the contract for 1064 squares of Scott's extra coated roofing tin for use on the plant of the Nagle Corliss Engine Works, Erie, Pa. This brings the total quantity used by the Nagle company to over 1000 boxes, and it is probably the largest area ever covered by one concern with one brand of roofing tin.

The American Steam Gauge & Valve Mfg. Company, Boston, Mass., has received from the Newport News Shipbuilding & Dry Dock Company an order for eight Government composition triplex safety valves for the torpedo boat destroyers Roe and Terry. A similar order has been received from the Wm. Cramp & Sons Ship & Engine Building Company for eight triplex valves for the torpedo boat destroyers Nos. 30 and 31.

The Steel Fireproofing Company has been organized at Wheeling, W. Va., and has secured 1½ acres of land at Glenova from the Wheeling Board of Trade, on which it will build a plant for the manufacture of steel lathing. A building is being erected, 50 x 150 ft., and when this is completed the company will make plans for other lines of product which will call for additional buildings. The incorporators are Frank Dickerson, Great Neck, N. Y.; Herbert E. Marks, Poughkeepsie, N. Y.; F. S. Dickerson, Pelham Manor, N. Y.; Francis H. Appleton, Jr., Hyde Park, Mass., and Charles H. Blackman, Brooklyn, N. Y.

The American Motor Sales Company, Indianapolis, Ind., has under construction a new automobile plant consisting of two buildings, one 80 x 368 ft. and the other 68 x 368 ft., both two stories. These buildings will occupy a site near the present Overland factory on Oliver avenue west of White River, in West Indianapolis. When finished they will add 109,000 sq. ft. to the factory capacity.

The Big Bend Light & Power Company, Spokane, Wash., has filed articles of incorporation with a capital stock of \$300,000. The company will also establish an office at Whitefish, Mont., with E. Messenger as agent.

The Standard Steel Car Company, Pittsburgh, works at Butler, Pa., has received an order from the Lehigh Valley Railway for 15 steel passenger coaches.

The H. W. Johns-Manville Company, Milwaukee, Wis., has taken a large contract for asbestos covering from the Chicago, Milwaukee & Puget Sound Railroad.

The Ohio Motor Company has arranged with the Minneapolis Steel & Machinery Company, Minneapolis, Minn., to handle its 4 to 50 hp. gas and gasoline engines.

The Petroleum Iron Works Company, Pittsburgh, Pa., builder of heavy plate construction of all kinds, is now building a large number of 55,000 and 37,000 bbl. and smaller oil tanks in various parts of the United States and is exporting considerable

tank materials to England and other foreign countries. Some tanks are located in Connecticut, New Jersey and Maryland, and in the Ohio, Illinois, Oklahoma and Texas oil fields. The company is building and shipping a large number of portable oil field tanks of 100 bbl. capacity and is working on orders for high pressure tanks, 4500 to 6000 gal. capacity, at Wheeling, W. Va. It is building 10,000-gal. horizontal acid tanks and self-supporting steel stacks for the United States Steel Corporation at Cleveland, Ohio. The company is now at work on two water softener plants for the Jones & Laughlin Steel Company at its new All-quippa plant, and is building nine purifying boxes for the Consolidated Gas Company in New York and other Eastern cities. It is also estimating on several large lots of oil tank cars for various railroads, of 8000, 10,000 and 12,000 gal. capacity, and is bidding on cement plants, blast furnace plant including foundations, brickwork and machinery complete, in water tanks and towers. Extensive additions to the works at Sharon have just been completed, giving 50 per cent. additional floor space, and the latest type of rotary planers, 50-in. plate planer, made by Niles-Bement-Pond Company, two 15-ton Alliance electric traveling cranes and other machinery have been installed.

The Henry P. Burgard Company, Buffalo, N. Y., is in the market for 50 tons of corrugated steel bars, to be used in connection with subway work under the Erie Railroad tracks at Bailey avenue.

Wm. A. Shepard & Co., general contractors, 701 Pine avenue, Niagara Falls, N. Y., are in the market for the following material, to be used in connection with the contract they recently received for laying 4 miles of heavy water main: 61 tons of lead, compressed air calking machine, melting kettle with capacity to melt 300 lb. lead to a heat.

The Department of Water Supply of the city of New York has been supplied with three 1500-ft. portable drilling machines by the Keystone Driller Company, Beaver Falls, Pa. They are to be used for putting down wells on Long Island for the water supply of the Borough of Brooklyn. The rigs are the same as the regular No. 15 oil rig, except that the boiler, which is mounted on a separate truck and located at a distance for oil and gas drilling, is in this case mounted on the machine. The company has recently made a shipment of seven large double stroke geared deep well pumps for the town of Zacatecas, Mexico. The pumps are a part of a \$1,000,000 water supply plant for the city which is being installed by the Government of Mexico. The city of Nappanee, Ind., has doubled the capacity of its water supply plant by the installation of a second double stroke geared pump manufactured and installed by the Keystone Driller Company, which also had the contract for boring the additional well. One large double stroke geared pump and two single stroke geared pumps are being installed at the plant of the United Ice & Coal Company, Harrisburg, Pa., by the company. The water obtained is to be used in the manufacture of ice. It has been found that artesian water is purer than the city supply, but the greatest saving is effected in the cooling of the water. It is said the artesian supply can be frozen at a cost of about 30 per cent. less than in the case of the city water.

The Crawfordville Heating Company, recently organized to build a hot water heating plant in Crawfordville, Ind., has elected the following officers: President, H. H. Ristine; vice-president, W. P. Herron; secretary, Dumont M. Peck; treasurer, James E. Evans. The plans contemplate the completion of the plant by October 1.

The Crown Metal Construction Company, Jamestown, N. Y., manufacturer of metal furniture, has bought an existing plant, which it will equip with machinery with the expectation of having it in operation by July 1. Nearly all of the required machines have been purchased. David Lincoln is president; John Winnberg, vice-president, and David Hillstrom, secretary and treasurer.

The Myers Voting Machine Company has been incorporated at Goshen, Ind., with \$20,000 capital stock, to manufacture voting machines. The directors are E. L. D. Foster, Bethany A. Myers and Arthur L. Griffin.

The McFarlan Carriage Company, Connerville, Ind., will enlarge its business by manufacturing automobiles.

Daniel Rich has been appointed receiver for the Fink-Anderson Engineering Company, South Bend, Ind., and has taken charge of the plant.

The Harris Air Pump Company, Indianapolis, Ind., has increased its capital stock from \$150,000 to \$225,000.

The Society of Automobile Engineers has been incorporated, with principal offices in New York. The directors include the following: A. H. Whiting, Alex Churchward, Horace M. Swetland, Thomas J. Fay, New York; Henry Hess, Philadelphia; Russell Huff, Detroit; B. D. Gray, Providence, R. I.; David Fergusson, Buffalo; Henri C. Chatain, Schenectady; F. J. Newman, Chicago; R. C. Carpenter, Ithaca; Andrew L. Riker, Bridgeport, Conn.

The Iron and Metal Trades

The event of the week has been the allotment of the greater part of the Harriman order for rails, of which 79,000 to 80,000 tons went to Chicago, 10,000 tons thereof to be open hearth rails, 19,000 tons went to the Tennessee Company and 12,000 tons, for the Mexican part of the system, to the Carnegie Company. The Colorado Fuel & Iron Company was awarded between 22,000 and 25,000 tons. The Tennessee Company resumed single turn at Ensley last week, having booked 5000 tons for the Georgia Central and 6500 tons for the Seaboard. Among the other sales reported are 17,500 tons for the St. Louis & Southwestern, 5000 tons for the Wichita Falls, 9000 tons additional for the Chicago & Alton, about 6000 tons additional for the Erie, 2700 tons for the Louisiana & Arkansas and 1200 tons for the Elgin, Joliet & Eastern. An order was also placed for 19,000 tons for a road whose name is withheld. Altogether very close to 225,000 tons of rails have been booked, but there is still a feeling among makers that the railroads are unduly holding back business.

There has been a good deal of exaggeration about purchases of cars. Among the cars recently placed have been 1000 for the New Jersey Central and 500 for the Reading road, with 3500 pending for the Baltimore & Ohio. All the plates and shapes go to Pittsburgh mills.

Atlantic Coast shipyards have been taking additional business and some of them are comfortably full for a good part of the year. The Newport News has four freighters for the Southern Pacific, two boats for the Savannah Line and one for the Associated Oil Company on the West Coast. The Maryland Steel Company has three ships for the Hawaii Line and a 4000-ton freighter. The Fore River yard is to build a 5000 to 6000 ton boat for the Union Sulphur Company, while Harlan & Hollingsworth have taken the order for a passenger steamer for the Maine Line. The New York Shipbuilding Company is to build a 6000-ton collier for the Coast Transportation Company. Bids are to be opened next week for a 12,000-ton collier for the Government, similar to the one contracted for some time since by the Cramps.

Two 600-ft. ore freighters for the Steel Corporation have been contracted for for the next season. They will be built at Lorain.

A moderate amount of fabricated structural work has been awarded during the week, this including 3500 tons for the City Hospital at San Francisco, 2250 tons for the Peoria & Pekin Bridge, 1700 tons for the St. Paul road and 2600 tons for the Passayunk Bridge at Philadelphia. A good deal of heavy work is still pending, and the outlook is cheerful.

Only a moderate business has been done in pig iron, but the markets are steady, with some tendency toward hardening in some quarters. At Pittsburgh inquiries have been made by steel companies for 30,000 to 40,000 tons of Bessemer iron for delivery in the second half of the year.

A movement is on foot to bring about a consolidation among some of the more important bar mills in central and eastern Pennsylvania. It has nothing to do with the merger of mills recently announced.

Conferences are taking place in the Central and Western territory over labor matters, involving the bar, sheet and tin plate trades. No interruptions likely to seriously affect the markets are expected to develop.

Copper has again receded below the 13 cent level for electrolytic. The market is being made only on small transactions, since the majority of buyers have well covered for the next two months.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	June 23, 1909.	June 16, 1909.	May 26, 1909.	June 24, 1908.
FIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$16.50	\$16.50	\$16.25	\$16.50
Foundry No. 2, Southern, Cincinnati	14.75	14.50	14.50	15.25
Foundry No. 2, local, Chicago ..	16.50	16.50	16.50	17.85
Basic, delivered, eastern Pa.	15.50	15.50	15.50	15.25
Basic, Valley furnace	15.00	14.75	14.25	15.25
Bessemer, Pittsburgh	16.15	16.15	15.90	16.90
Gray forge, Pittsburgh	14.90	14.90	14.40	14.90
Lake Superior charcoal, Chicago	19.50	19.50	19.50	20.00

BILLETS, &c., Per Gross Ton:				
Steel billets, Pittsburgh	23.00	23.00	23.00	25.00
Forging billets, Pittsburgh	26.00	25.00	25.00	27.00
Open hearth billets, Philadelphia	25.00	25.00	24.50	26.20
Wire rods, Pittsburgh	29.00	29.00	29.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	14.50	15.00	14.25	12.50
Steel rails, melting, Philadelphia	16.00	16.00	15.25	13.50
Iron rails, Chicago	17.00	17.00	17.00	15.50
Iron rails, Philadelphia	19.50	19.50	18.50	18.00
Car wheels, Chicago	16.00	16.00	15.00	13.00
Car wheels, Philadelphia	15.00	15.00	15.00	13.50
Heavy steel scrap, Pittsburgh	15.75	15.75	15.50	13.25
Heavy steel scrap, Chicago	14.50	14.50	14.00	11.50
Heavy steel scrap, Philadelphia	16.00	16.00	15.25	13.50

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia ..	1.45	1.45	1.40	1.40
Common iron bars, Chicago	1.35	1.35	1.30	1.50
Common iron bars, Pittsburgh ..	1.40	1.40	1.30	1.40
Steel bars, tidewater, New York	1.36	1.36	1.36	1.56
Steel bars, Pittsburgh	1.20	1.20	1.20	1.40
Tank plates, tidewater, New York	1.41	1.41	1.46	1.76
Tank plates, Pittsburgh	1.25	1.25	1.30	1.60
Beams, tidewater, New York ..	1.41	1.41	1.46	1.76
Beams, Pittsburgh	1.25	1.25	1.30	1.60
Angles, tidewater, New York ..	1.41	1.41	1.46	1.76
Angles, Pittsburgh	1.25	1.25	1.30	1.60
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.45
Skelp, sheared steel, Pittsburgh ..	1.40	1.40	1.40	1.50

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.50
Wire nails, Pittsburgh	1.70	1.70	1.70	1.95
Cut nails, Pittsburgh	1.65	1.65	1.65	1.75
Barb wire, galv., Pittsburgh	2.00	2.00	2.00	2.40

METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	13.25	13.62½	13.50	13.00
Electrolytic copper, New York ..	13.00	13.37½	13.25	12.87½
Spelter, New York	5.40	5.50	5.20	4.55
Spelter, St. Louis	5.27	5.35	5.05	4.40
Lead, New York	4.35	4.35	4.40	4.50
Lead, St. Louis	4.20	4.25	4.30	4.40
Tin, New York	29.05	29.50	29.15	27.60
Antimony, Hallett, New York ..	7.50	7.50	7.75	8.50
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	\$3.64	\$3.64	\$3.64	\$3.89

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 20c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural steels and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.25c. to 1.30c., net; I-beams over 15 in., 1.35c., net; H-beams over 8 in., 1.45c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.30c., net; angles, over 6 in., 1.35c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.45c., base, half extras, steel bar card; tees, 3 in. and up, 1.30c., net; tees, 3 in. and up, 1.30c., net; angles, channels and tees, under 3 in., 1.20c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.60c., net; hand rail tees, 2.70c., net; checkered and corrugated plates, 2.70c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.25c. to 1.30c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¾-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered $\frac{1}{4}$ -in. plate. Steel plates over 72 in. wide must be ordered $\frac{1}{4}$ -in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under $\frac{1}{4}$ -in. to and including 3-16-in. plates on thin edges.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete circles.....	.20
Boiler and flange steel plates.....	.10
"A. B. M. A." and ordinary firebox steel plates.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Shell grade of steel is abandoned.....	
For widths over 100 in. up to 110 in.....	.05
For widths over 110 in. up to 115 in.....	.10
For widths over 115 in. up to 120 in.....	.15
For widths over 120 in. up to 125 in.....	.25
For widths over 125 in. up to 130 in.....	.50
For widths over 130 in.....	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, No. 10 and heavier, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 2.05c.; box annealed sheets, Nos. 17 to 21, 2c.; Nos. 22 to 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Galvanized sheets, Nos. 13 and 14, 2.25c.; Nos. 15 and 16, 2.35c.; Nos. 17 to 21, 2.50c.; Nos. 22 to 24, 2.65c.; Nos. 25 and 26, 2.85c.; No. 27, 3.05c.; No. 28, 3.25c.; No. 29, 3.25c.; No. 30, 3.60c. Painted roofing sheets, No. 28, 1.55c. per square. Galvanized roofing sheets, No. 28, 2.80c. per square for $2\frac{1}{2}$ -in. corrugations.

Wrought Pipe.—Discounts on steel pipe, $\frac{3}{4}$ to 6 in., in carloads to the largest trade, are 81 and 5 per cent. off list, and on iron pipe, $4\frac{1}{2}$ to 8 in., are 78 and 5 per cent. off list.

Boiler Tubes.—Regular discounts are as follows:

Boiler Tubes.	
1 to $1\frac{1}{2}$ in.....	.50
$1\frac{1}{2}$ to $2\frac{1}{4}$ in.....	.62
$2\frac{1}{4}$ to 5 in.....	.70
$2\frac{1}{2}$ in.....	.64
6 to 13 in.....	.62
$2\frac{1}{2}$ in and smaller, over 18 ft. long, 10 per cent. net extra.	
$2\frac{3}{4}$ in. and larger, over 22 ft. long, 10 per cent. net extra.	

Wire Rods.—Bessemer rods, \$29; chain rods, \$29; basic rods, \$29 to \$30.

Chicago.

FISHER BUILDING, June 23, 1909.—(By Telegraph.)

The final allotment of the Harriman rail order, amounting to nearly 150,000 tons, was a notable feature of last week's market. Other rail orders reported bring the total for the week very close to 175,000 tons. Of this a little more than 100,000 tons will be rolled at Gary and at the South Works mills of the Illinois Steel Company. This insures the operation of the South Works mills at full capacity for the remainder of the year and the running of the Gary mill at a faster gait than hitherto. Its output has recently been increased from 1000 to 1500 tons a day, and owing to the urgency of the railroads for early delivery of rails ordered, it will likely be keyed up soon to fuller capacity. There is no lack of specifications in any of the finishing departments of the Illinois Steel Company's mills, in some of which deliveries are now more or less retarded. Nine open hearth furnaces are being operated at Gary, and preparations are being made to put in another one. It is expected that the billet mill at these works will be completed early in August, and its product will supply any deficiency that may exist in the steel required in the company's mills. A decidedly stronger sentiment exists in all divisions of the iron and steel market. Concessions from quoted prices are more and more difficult to obtain, and in the leading lines of finished material have almost entirely disappeared. A number of inquiries for shapes, plates and other material recently put out by car builders suggests revival of activity in this industry, which for a long time has been extremely quiet. Recent purchases aggregating 10,000 tons of pig iron and 2500 tons of old car wheels by a prominent car wheel interest are of similar significance. In view of the continued influx of specifications against the heavy contracts for finished material already entered, the outlook for active work through the summer months is most promising.

Pig Iron.—The situation in pig iron is characterized by a firmer feeling, which now extends to all producers both North and South. Of the iron included in last week's trading, the greater part went to Northern furnaces. Several lots of 1000 tons or more are reported to have been entered by local interests, one of whom sold 4000 tons of malleable Bessemer to a leading car wheel interest. This is in addition to 6000 tons purchased by this concern two weeks ago.

The price for Northern iron is strong at \$16, furnace, and sellers are generally notifying customers that all outstanding quotations in which the limit for acceptance is not specifically stated are withdrawn. The price of \$11.50, Birmingham, for last half delivery, was withdrawn Tuesday by the leading Southern interest, and at this writing its price for last half bookings has not been announced. Another prominent Alabama producer has practically withdrawn from the market for third quarter and is holding for \$12.25 for fourth quarter. Two other well-known interests in that district are open for last half tonnage at \$12, Birmingham. It is possible that some prompt iron in moderate lots can still be had at \$11.50, but the minimum price for forward delivery seems to be pretty well established at \$12. The following prices are for June delivery, f.o.b. Chicago:

Lake Superior charcoal.....	\$19.50 to \$20.00
Northern coke foundry, No. 1.....	17.00 to 17.50
Northern coke foundry, No. 2.....	16.50 to 17.00
Northern coke foundry, No. 3.....	16.00 to 16.50
Northern Scotch, No. 1.....	17.50 to 18.00
Southern coke, No. 1.....	16.35 to 16.85
Southern coke, No. 2.....	15.85 to 16.35
Southern coke, No. 3.....	15.35 to 15.85
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	16.35 to 16.85
Southern coke, No. 2 soft.....	15.85 to 16.35
Southern gray forge.....	14.35 to 14.85
Southern mottled.....	14.10 to 14.60
Malleable Bessemer.....	16.50 to 17.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6 %.....	19.90 to 20.40
Jackson Co. and Kentucky silvery, 8 %.....	20.90 to 21.40
Jackson Co. and Kentucky silvery, 10 %.....	21.90 to 22.40

(By Mail.)

Billets and Rods.—The principal transactions of last week in semifinished material included 4000 to 5000 tons of export billets for shipment to Montreal and 1000 tons of forging billets to a Milwaukee machinery builder by the leading interest. The price realized on forging billets was equivalent to \$26.50, base, Chicago. Aside from this only a few scattering orders are reported, and the minimum price on forging billets is now \$26, Chicago. It is doubtful, however, if any considerable tonnage could be placed at this figure, the tendency being toward a firmer holding for better prices. The leading makers of wire rods are apparently not seeking new business, but ruling prices are said to strictly govern current transactions.

Rails and Track Supplies.—In the distribution of around 150,000 tons of rails placed by the Harriman lines last week, 111,000 tons was secured by the Steel Corporation, the allotment being as follows: Illinois Steel Company, 80,000 tons; Carnegie Steel Company, 12,000 tons; Tennessee Coal, Iron & Railroad Company, 19,000 tons. Of the Illinois Steel Company's allotment, 10,000 tons are open hearth, and will be rolled at Gary. There was also placed with the Illinois Steel Company 17,500 tons by the St. Louis & Southwestern Railroad, together with other orders from miscellaneous sources amounting to 3000 tons. Orders were entered by the Lackawanna Steel Company for 500 tons of 60-lb. rails from the Sheboygan Light & Power Company and 2500 tons by the Chicago, Minneapolis & Sault Ste. Marie. To these purchases is added 1200 tons placed by a Western road with an Eastern mill, which has under consideration an inquiry for 1200 tons from another line. The demand for spikes and bolts is very heavy. Within the first 16 days of this month the Illinois Steel Company booked 40,000 kegs of spikes and 17,000 kegs of bolts, which is considerable in excess of the capacity of the Joliet mills for a like period. These bookings have since been augmented by the receipt of orders for 6000 kegs of spikes and 7000 kegs of bolts. The mills are now 60 days behind in deliveries on the latter. Light rails for the No. 2 mill at the South Works are coming in at the rate of 1000 tons a week, and prices are firm at the following quotations: 40 to 45 lb. sections, \$26; 30 to 35 lb. sections, \$26.75; 16, 20 and 25 lb. sections, \$27; 12-lb. sections, \$28, Chicago, less 50c. a ton on lots under 500 tons and \$1 a ton on lots over 500 tons.

Structural Material.—Quite a number of small and medium sized orders for fabricated material were placed last week. The Western Division of the American Bridge Company is understood to have taken nearly 6000 tons, in which were included the following contracts: City Hospital, San Francisco, 3500 tons; Illinois Central, two-span bridge for track elevation, 100 tons; Borland Warehouse, Chicago, 700 tons; the fair grounds and grand stand, St. Paul, 150 tons, and bridge material for the Burlington road, 100 tons. The Chicago, Milwaukee & St. Paul placed orders for bridge material, which was distributed as follows: 600 tons to the Riter-Conley Mfg. Company, 500 tons to the Milwaukee Bridge Company, 800 tons to the Pennsylvania Steel Company. The Zion Mercantile Association, Salt Lake City, placed 320 tons with the Minneapolis Steel & Machinery Company, and the Colorado & Southern Railroad 150 tons with the Wisconsin Bridge Company. The Ward-Corby Building, Chicago, went to the Modern Steel Construction Company. The Peoria and Pekin Union Bridge, 2250 tons, was let to McClintic-Marshall Construction Company. The local branch of the leading interest submitted bids last week on 10,320 tons of fabricated work, and has a larger tonnage

under consideration for the present week. The volume of prospective business is very large, and it is expected that several local building projects calling for several thousand tons each will yet be included in this year's contracts. Specifications for plain material are being received by the mills at a rate beyond their productive capacity, and deliveries are in consequence beginning to lengthen out. Prices on shapes are firm at 1.48c., Chicago.

Plates.—Some good sized inquiries are being put out from the car shops. While none of the contemplated orders for the 10,000 cars now under negotiation have been placed, car builders are taking prices on material in anticipation of this business. The mills are well supplied with specifications and deliveries are gradually becoming more and more retarded. As an indication of the situation in this respect, it is stated that the specifications received by the Illinois Steel Company on Monday aggregated more than a week's rolling capacity for the South Works mills. A fair amount of new business is being placed, the leading interest having entered new orders amounting to 7000 tons thus far this month. Prices are now strong at 1.48c., Chicago.

Sheets.—The question of deliveries is beginning to cut some figure in the placing of sheet orders. The local mills are not offering shipments inside of from three to four weeks from receipt of order and the prompt requirements thus diverted to other mills are gradually filling up other mill capacities. While prices are improving, absolute firmness at current quotations has not yet been attained. The continued advance of spelter has had a strengthening influence upon galvanized sheets, in which less irregularity is observed. Such weakness as exists has narrowed down pretty closely to the lighter gauges of black sheets.

Bars.—New orders for steel bars are comparatively light, the bulk of requirements in this line being pretty well covered by contracts already placed, running all the way from the coming October to July of next year. That there are yet some unsatisfied needs is evident from the fact that new orders to the extent of 6000 tons have been entered thus far this month by the Illinois Steel Company. Interest is now mainly centered in specifications, which are being freely offered by the implement makers and other manufacturers, who are inclined to forestall possible delay in securing shipments by ordering ahead of actual needs. A few of the independent mills are not running beyond 65 per cent. of capacity, while others, including those of the leading interest, are going full. The situation in iron bars continues to improve, and prices are slowly firming up. Some irregularity still exists, but in view of the demand that is expected to follow increased activity in new building there is less disposition among the mills to load up with cheap tonnage. At a joint meeting of Western Bar Iron Association and the Amalgamated Association, to be held on Wednesday of this week at Cambridge Springs, Pa., an effort will be made to conclude the pending wage scale settlement. We quote as a minimum on steel bars 1.38c., Chicago, noting that several of the independent mills are holding \$1 a ton above this price; bar iron, 1.35c., Chicago, which on desirable specifications is occasionally shaded \$1 a ton.

Merchant Pipe.—Beyond a moderate but steady increase in the volume of business, there are no developments of note in the demand for merchant pipe. The activity in new construction has brought out some fair sized orders for specific work, but jobbers are buying for small requirements about as they have been for some time past. Prices continue firm at the recognized discounts.

Boiler Tubes.—Demand continues listless. Requirements of the boiler shops which have increased but little are being taken care of, as they have been for some time by shipments from jobbers' stocks. Beyond a few carload orders recently placed for locomotive tubes, nothing of significant interest has developed in this line.

Cast Iron Pipe.—The only prospective letting of considerable size in cast iron pipe is a lot of 2500 tons, to be awarded this week by Cincinnati. Other municipal requirements include 700 tons for Auburn, Kan., to be let June 25, and 250 tons for Knox, Ind., on which bids will be opened June 28. In addition to these there is an inquiry out from the C. B. & Q. for 300 tons of culvert pipe. Pipe foundries generally regard the remarkable expansion of new building in towns and cities throughout the country as significant of water works extensions that later in the season will result in a heavier demand for pipe. We quote per net ton, Chicago, as follows: Water pipe, 4 in., \$27.50; 6 to 12 in., \$26.50; 16 in. and up, \$25.50, with \$1 extra for gas pipe.

Metals.—Demand for copper has eased off, and while a fair number of orders is being placed, they are mostly for small lots for immediate delivery. There is, in fact, almost an entire absence of future buying, and prices are slightly weaker, especially on lake copper. Both spelter and sheet zinc are in good demand and higher, spelter having advanced 10 cents and sheet zinc 25 cents per 100 lb. Old metals are quiet and unchanged. Quotations are as follows: Casting copper, 13½c.; lake, 14c., in car lots, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, car lots, 31c.; small

lots, 33c.; lead, desilverized, 4.50c. to 4.60c., for 50-ton lots; corroding, 4.75c. to 4.85c., for 50-ton lots in car lots, 2¼c. per 100 lb. higher; spelter, 5.45c. to 5.50c.; Cookson's anti-mony, 10½c., and other grades 9¾ to 10¼c.; sheet zinc is \$7, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¼c.; copper bottoms, 11¼c.; copper clips, 12¼c.; red brass, 12c.; yellow brass, 9¼c.; light brass, 7c.; lead pipe, 4¼c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 23c.; block tin pipe, 26c.

Old Material.—An easing up of the tension that has characterized the scrap market for several weeks is observed. With the exception of foundry melting grades, iron fish plates and car axles, which are slightly weaker, the market is practically stationary. A notable feature brought out in connection with current transactions is the fact that while concessions are obtainable on small offerings, round lots, especially in rerolling steel rails, car wheels, heavy melting steel and other leading grades are strongly held. Thus a lot of three or four cars of old wheels on track went at \$15.50, while \$16 connecting line, equivalent to \$16.25, Chicago delivery, was paid by a car wheel interest on 2500 tons purchased from a Western road. Rumors of heavy purchases of melting steel for the Gary plant lack verification and are believed to be groundless. Railroads are realizing good prices on all material offered, a considerable portion of which is being taken direct by consumers. The lists to be closed this week include 10,000 tons from the Great Northern, in which are offered 1000 tons of rerolling steel rails and 5000 tons of iron rails, the latter item having appeared in several preceding lists, also 6500 tons from the Chicago, Burlington & Quincy. The following prices are per gross ton, f.a.b. Chicago:

Old iron rails.....	\$17.00 to \$17.50
Old steel rails, rerolling.....	15.50 to 16.00
Old steel rails, less than 3 ft.....	14.50 to 15.00
Relaying rails, standard sections, subject to inspection.....	22.50 to 23.50
Old car wheels.....	16.00 to 16.50
Heavy melting steel scrap.....	14.50 to 15.00
Frogs, switches and guards, cut apart.....	14.50 to 15.00
Mixed steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$16.25 to \$16.75
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.75 to 18.25
No. 1 railroad wrought.....	13.25 to 13.75
No. 2 railroad wrought.....	12.25 to 12.75
Springs, knuckles and couplers.....	13.50 to 14.00
Locomotive tires, smooth.....	14.75 to 15.25
No. 1 dealers' forge.....	11.00 to 11.50
Mixed busheling.....	8.00 to 8.50
Steel axle turnings.....	9.75 to 10.25
Machine shop turnings.....	8.00 to 8.50
Cast borings.....	6.00 to 6.50
Mixed borings, &c.....	6.00 to 6.50
No. 1 mill.....	7.00 to 7.50
No. 2 mill.....	6.00 to 6.50
No. 1 boilers, cut to sheets and rings.....	10.25 to 10.75
No. 1 cast scrap.....	13.50 to 14.00
Stove plate and light cast scrap.....	11.50 to 12.00
Railroad malleable.....	13.00 to 13.50
Agricultural malleable.....	11.25 to 11.75
Pipes and flues.....	10.00 to 10.50

Buffalo.

BUFFALO, N. Y., June 22, 1909.

Pig Iron.—The market continues strong, with a fair degree of activity in all grades and covering a wide variety of business. The sales in this immediate vicinity for the past week aggregate about 30,000 tons, so far as can be learned, a considerable portion being malleable and practically all for early or third quarter delivery. The malleable ordered was quite largely for railroad work, the manufacture of such material having begun to come into the market a little more freely. Ruling prices for spot and early delivery are as quoted below, f.o.b. Buffalo. For fourth quarter delivery prices asked are higher by 25c. to 50c. per ton.

No. 1 X.....	\$15.25 to \$15.75
No. 2 X.....	14.75 to 15.25
No. 2 plain.....	14.50 to 15.00
No. 3 foundry.....	14.25 to 14.75
Gray forge.....	14.25 to 14.50
Malleable Bessemer.....	15.00 to 15.50
Basic.....	15.50 to 16.00
Charcoal.....	19.50 to 20.00

Finished Iron and Steel.—The week has shown a large aggregate of new orders in bars, plates and structural shapes, made up principally of small and moderate sized lots at the higher prices now asked by independent interests. One or two mills were obliged to decline orders in some lines, not being able to give the deliveries asked. Rail orders and orders for other railroad material are coming in more freely. Specifications on contracts continue heavy, and the aggregate of June specifications will probably exceed those for May or April, both of which were large. Several structural contracts of good tonnage are to be figured on within the next two weeks. The American Laundry Machinery Company, Rochester, is receiving preliminary bids for its building, requiring about 500 tons of steel, in which the various manufacturing branches of the company will be consolidated. Bids will also shortly be received for the steel frame car re-

pair shop which the Lackawanna Railroad is to add to its East Buffalo car and locomotive shops, about 700 tons, and for addition to stockhouse for the Phoenix Brewery, Buffalo, 200 tons.

Old Material.—The market is easier in all lines on account of mills being pretty well supplied and to preparations for inventory taking July 1. Dealers regard the outlook for the future as encouraging, however, and prices are well maintained, with no material change from last week. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel scrap.....	\$14.75 to \$15.50
Low phosphorus steel scrap.....	18.75 to 19.25
No. 1 railroad wrought.....	16.00 to 16.50
No. 1 railroad and machinery cast scrap.....	15.00 to 15.50
Old steel axles.....	19.00 to 19.50
Old iron axles.....	20.75 to 21.25
Old car wheels.....	15.00 to 15.50
Railroad malleable.....	14.50 to 15.00
Boiler plate.....	13.00 to 13.50
Locomotive grate bars.....	12.00 to 12.50
Pipe.....	12.00 to 12.50
Wrought iron and soft steel turnings.....	9.00 to 9.50
Clean cast iron borings.....	7.50 to 8.00
No. 1 busheling scrap.....	13.00 to 13.50
No. 2 busheling scrap.....	11.00 to 11.50

Pittsburgh.

PARK BUILDING, June 23, 1909.—(By Telegraph.)

Pig Iron.—Some heavy inquiries are in the market for Bessemer iron, two or three leading steel interests asking for prices on 30,000 to 40,000 tons for delivery over the last half of the year. The output of Bessemer iron by the valley furnaces is not very heavy at present, most of the stacks running on foundry and basic, and it may be a difficult matter to pick up the large tonnage asked for except at advancing prices. The Algoma Steel Company of Sault Ste. Marie, Ontario, is inquiring for 5000 tons of basic for last half of the year delivery. Some fair sized inquiries are also out for foundry iron, and the indications are that the pig iron market will soon be more active. Prices are firm, and basic has sold in the past week at \$14.85 to \$15, at Valley furnace, the minimum of the market to-day being \$15, at furnace. We quote Bessemer iron at \$15.25; basic, \$15; malleable Bessemer, \$14.75; No. 2 foundry, \$15.25, and forge, \$14 to \$14.15, all at Valley furnace, the freight to the Pittsburgh District being 90c. We note sales of 5000 to 6000 tons of basic iron at \$14.85 to \$15, at Valley furnace, and 250 tons of Bessemer at \$15.25, at Valley furnace.

Steel.—A decided scarcity has developed in the supply of open hearth billets, and one leading maker is reported as asking \$24. The whole steel market is decidedly firmer, owing to the largely increased consumption, and forging billets have advanced at least \$1 a ton. We quote Bessemer and open hearth billets at \$23, sheet and tin bars at \$24 to \$25, and forging billets, \$26 to \$27, Pittsburgh.

(By Mail.)

Prospects of labor troubles in union sheet and tin plate mills, and possibly in the bar iron mills to commence July 1, are disturbing factors in the situation, which otherwise is satisfactory from every standpoint. At the delegate meeting of the Amalgamated Association in this city last week it was voted to go on strike July 1 unless the American Sheet & Tin Plate Company rescinded its order that the present union sheet and tin mills will operate after July 1 on an "open shop" basis, and there is no possibility of the concern taking any such action. A conference is to be held at Cambridge Springs, Pa., between the Wage Committees of the Amalgamated Association and the Western Bar Iron Association for the purpose of trying to arrange a scale in the Western bar iron mills. Previous conferences were held at Detroit, but no settlement was reached, the mills asking a reduction of about 5 per cent., which the men refused to grant. Another conference between the independent sheet and tin mills and the Amalgamated Association is scheduled to be held in Pittsburgh on Tuesday, June 29, while no arrangements have yet been made for a conference with the Republic Iron & Steel Company, and this company will probably not ask for a conference until the result of the meeting with the Western Bar Iron Association is known. Altogether the outlook for the labor situation as it will exist after July 1 is uncertain, and should there be a shutdown of the union sheet and tin mills and the union bar iron mills, it would seriously disturb the market. In the meantime these mills are operating to utmost capacity and getting out as much product as possible before July 1. New orders in iron and steel products of all kinds are holding up remarkably well and specifications against contracts are coming in very freely, a good deal of tonnage under contract at low prices requiring that it be specified for before July 1. Shipments by the mills this month will likely show a material increase over May, and up to Saturday, June 19, the Carnegie Steel Company, in its billet and rail department, on orders sent to the mills was 23,000 tons ahead of the same

period in May. Prices generally are firm and an advance in wire products is looked for in the near future.

Ferromanganese.—The tone of the market is decidedly firmer, and \$41, seaboard, now seems to be the minimum price quoted, with some sellers asking \$41.50 to \$42, the freight to Pittsburgh being \$1.95 a ton. A sale of 500 tons of 80 per cent. foreign ferro at \$40.50 or \$41, seaboard, for last six months of the year delivery is reported, but not confirmed.

Ferrosilicon.—Prices continue very firm and there is more inquiry than for some time, due to the fuller operation of the mills by consumers. We quote 50 per cent. for third quarter delivery at \$61.50 to \$62, Pittsburgh, while for spot shipment this material is very scarce and commands \$65 and as high as \$70 in carloads for spot delivery.

Rods.—Consumers are specifying liberally against contracts placed some time ago and there is a fair amount of new buying, a leading maker reporting a sale of 500 tons of chain rods at the full price of \$29, Pittsburgh. We quote Bessemer, chain and open-hearth rods at \$29, Pittsburgh.

Muck Bar.—There is more inquiry in the market than for some time, but most consumers of muck bar make their own and not a great deal is sold in the open market. We continue to quote best grades of muck bar made from all pig iron at \$27, Pittsburgh.

Skelp.—Some very large gas and oil line projects are under way, and if put through will require a very heavy tonnage of sheared iron and steel plates. Prices are firm and we quote: Grooved steel skelp at 1.30c. to 1.35c.; sheared, 1.40c. to 1.45c.; grooved iron, 1.50c. to 1.55c., and sheared iron skelp, 1.55c. to 1.60c., all for ordinary widths and gauges, f.o.b. Pittsburgh.

Steel Rails.—After some months of negotiations, the Government of Argentine Republic has placed an order with United States Steel Products Export Company for 49,000 tons of rail, which will probably be open hearth, and will be rolled by the Tennessee Company, at Ensley. Of the Harriman order 12,000 tons of Bessemer rails for export to Mexico has been placed with the Carnegie Steel Company. This company has also received a specification from the Erie for 5360 tons of standard sections on an old contract and has taken 1300 tons for the Duluth, South Shore & Atlantic. The Carnegie Company booked orders last week for 1600 tons of light rails, but this week will be much heavier, more than that amount having already been booked. Some other negotiations for rails are under way, and it looks now as if some more orders will be placed at an early date. It is said the Harriman lines will buy additional rails. We quote standard sections at \$28, at mill, and light rails are as follows: 12-lb., \$28; 16, 20 and 25 lb., \$27; 30 and 35 lb., \$26.75; 40 and 45 lb., \$26, all in 250-ton lots, f.o.b. Pittsburgh. Over 250 tons and up to 500 tons, 60c. a ton less, and over 500 tons \$1 a ton less. Splice bars are 1.50c., at mill.

Plates.—Reports that the Pennsylvania Railroad was in the market for 35,000 cars and the Baltimore & Ohio for 10,000 to 15,000 cars are very much exaggerated and have little or no foundation in fact. The Pennsylvania is not actively negotiating for cars, but the Baltimore and Ohio is actively figuring on 3500 cars, and will likely place the contract in a short time. The Jersey Central has placed 500 steel cars with the American Car & Foundry Company and 500 with the Standard Steel Car Company, while the Philadelphia & Reading has placed an order with the Standard Steel Car Company for 500 all steel cars. The plates and shapes for the cars taken by the Standard Steel Car Company, 12,000 to 14,000 tons, will be rolled by the Carnegie Steel Company, while the Jones & Laughlin Steel Company will roll the plates and shapes for the 500 cars, about 6000 to 7000 tons, taken by the American Car & Foundry Company. Some projects are under way, and if put through will take a very heavy tonnage in plates, and demand from boiler shops and other consumers is showing betterment. Prices are firm, and we quote ¼-in. and heavier plates at 1.25c. for desirable orders, and 1.30c. to 1.35c., Pittsburgh, for small orders.

Structural Material.—There is a great amount of inquiry, but actual orders placed in the past week were lighter than for some time. The largest local job in sight is a steel bridge at Sewickley, Pa., about 5500 tons, on which bids have gone in and are to be opened on July 1. The American Bridge Company is said to be pretty well filled up for the balance of this year, and several of the leading independent fabricating interests report they have work enough ahead for the next several months and are bidding higher prices. The market on plain material is very firm, the absolute minimum on beams and channels up to 15-in. being 1.25c., while one leading interest is holding firm at 1.30c. and quoting 1.35c. on small orders.

Bars.—We note considerable improvement in the bar iron market, the recent advance in prices having had the effect of bringing out specifications more freely on contracts made before the recent advance took effect. Specifications on contracts on both iron and steel bars are coming in freely, and two leading mills are not booking new orders for steel bars

for delivery inside of six weeks or longer from date of order. A conference between the Western Bar Iron Association and the Amalgamated Association is to be held in Pittsburgh on Tuesday, June 29, to discuss the wage scale. We quote steel bars at 1.20c., minimum, but two or three of the leading local makers are holding steel bars at 1.25c., minimum, and refuse to consider a lower price. Common iron bars are quoted at 1.45c., Pittsburgh.

Tin Plate.—The American Sheet & Tin Plate Company is operating this week 93 per cent. of its serviceable tin mills and has two other mills ready for operation when conditions warrant, these being the Humbert Works at Connellsville, Pa., and the Monongahela Works on the South Side, Pittsburgh. Neither of these plants has operated for nearly two years, but both have been overhauled and put in first class condition. They are nonunion plants and if operated again will continue to run on that basis. A conference between the independent tin plate mills and the Amalgamated Association is to be held in Pittsburgh on Tuesday, June 29, but it is doubtful if a settlement of the tin plate scale will be reached. New demand continues heavy, as this is the height of the season in the tin plate trade and shipments by the mills are larger than at any time for some months. We quote at \$3.40 per base box for 100 lb. coke plates, and it is stated this price is being strictly held.

Sheets.—New demand for sheets is steadily increasing. This week the American Sheet & Tin Plate Company operated 78 per cent. of its serviceable sheet mills, while independent makers of sheets report a considerable increase in orders. Prices are firmer than for some time, but there is still some little shading being done on the lighter gauges of black and galvanized sheets, and also on roofing sheets. We quote one-pass box annealed black sheets, No. 28 gauge, at 2.20c., and No. 28, galvanized, at 3.25c., but these prices are being shaded on good orders. The regular price of painted roofing sheets, No. 28, is 1.55c. per square and of galvanized, No. 28, is 2.80c. per square, for $2\frac{1}{2}$ -in. corrugations, but these prices are also being shaded.

Hoops and Bands.—A fair amount of new business is being placed, and we continue to quote steel hoops at 1.50c. and bands at 1.15c., but in exceptional cases and for desirable orders, these prices are slightly shaded.

Spelter.—The market continues very firm, and demand is better than for some time. We quote prime grades of Western spelter at 3.35c., East St. Louis, equal to 3.47½c., Pittsburgh.

Spikes.—The Harriman lines have out a large inquiry for railroad spikes, which is now being figured on by the leading makers. Specifications against contracts placed some time ago continue to come in very freely. Prices are firm, and it is said some recent low quotations have been withdrawn. We quote railroad spikes at \$1.60 to \$1.65 for $5\frac{1}{2}$ x 9-16 in., and \$1.70 to \$1.75, base, for the smaller sizes, in carloads and larger lots, 5c. per keg additional being charged for less than carloads.

Merchant Pipe.—General conditions in the pipe trade continue very active, new demand being heavy and shipments and output by the mills are practically up to normal. The Busch-Everett-Walker Syndicate of St. Louis, which has had a project under way for some time of piping gas from Shreveport, La., fields to Memphis and New Orleans, has recently secured control of the LaCleve gas lines in St. Louis, and this natural gas project is now assuming a position that probably means an inquiry in the market shortly for 350 to 400 miles or probably more of the larger sizes of line pipe. The project is referred to as involving a capital of upwards of \$3,000,000, but this is probably exaggerated. However, pipe mills that roll the larger sizes of pipe are expecting this inquiry to come at an early date. Some other large gas and oil line projects are under way and are gradually developing and indications are that the pipe mills will be filled up before long to capacity on the larger sizes of pipe. The contract for supplying the city of Baltimore with fire protection system secured by the Pittsburgh Valve, Foundry & Construction Company will involve 18 to 20 miles of pipe, part of which will be wrought pipe and part cast iron pipe, which will probably go to Pittsburgh mills. The leading pipe interests are now operating closer to normal capacity than for a long time. One is filled for the next 60 days and is not actively seeking orders for pipe for delivery prior to July 15, or later. Official discounts are firmly held, these being on steel pipe 81 and 5 off list and on iron pipe 78 and 5 off list in carloads and larger lots to the large trade.

Boiler Tubes.—Inquiries are picking up considerably and more actual orders for both merchant and boiler tubes are being placed than for some time, but the mills could still take care of a good deal more business than is being offered. The boiler tubes for the Harriman locomotives to be built by the American Locomotive Company will likely go to Worth Brothers at Coatesville, Pa. Regular discounts on tubes continue to be shaded more or less, but the tone of prices is slightly firmer.

Iron and Steel Scrap.—While actual consumption of

scrap during July will be cut down considerably by reason of a number of mills closing for inventory and repairs, basic conditions in the scrap trade are good, and it is not believed that prices will show any decline. It is pointed out that consumption of scrap at present is enormously heavy and certain kinds, particularly heavy steel scrap for open hearth purposes, is picked up practically as fast as offered. The Baltimore & Ohio and the Pennsylvania scrap sold last week brought very good prices, higher than have been obtained for some time. The Baltimore & Ohio Railroad heavy steel and re-rolling mills went at \$16.50 on the line, its No. 1 railroad wrought scrap went at \$18.70, delivered in eastern Pennsylvania. Prices are firm, and we quote heavy steel scrap firm at \$16, in large lots, delivered at Sharon, Steubenville, Leechburg, Follansbee, Monessen and Pittsburgh districts. It is possible a few small odd lots of heavy steel scrap might be picked up at \$15.75, but such available tonnage is very small. Heavy steel scrap of Crucible Steel Company specifications usually brings about \$1 a ton higher than ordinary heavy scrap. Dealers quote cast iron borings at \$10, bundled sheet scrap \$14 at consuming point, No. 1 cast scrap for foundry use at \$15 to \$15.25, No. 2 \$14.50, sheet bar crop ends \$17.50, No. 1 railroad malleable \$14.75 to \$15, grate bars \$13, No. 1 busheling \$14 to \$14.25, No. 2 \$12 to \$12.25, low phosphorous melting stock 0.04 and under \$18.75 to \$19, re-rolling rails \$16.50, old car wheels \$16.25 to \$16.50, demand being active. Locomotive axles are much higher and are held at \$25 to \$26 and locomotive tires have also advanced and are held at \$18 minimum, machine shop turnings are \$12 to \$12.25, re-rolling rails \$18 to \$18.25, iron axles about \$24, steel axles \$19.50 to \$20 and stove plate \$11.75 to \$12. We note sales of 2000 to 2500 tons of heavy melting scrap, delivery at Sharon, Steubenville, Follansbee, at about \$16, while a few small lots have been sold at \$15.75, delivered, at above points. We also note sales of 1000 tons of cast iron borings at \$10 in gross tons to a Pittsburgh consumer, 1000 tons of turnings at \$12 and 300 tons of turnings at \$12.25; also 500 tons of re-rolling rails at \$17, delivered Elyria, Ohio, and 1000 tons of bundled sheet scrap at \$14.25, delivered at consuming point. All above prices in quotations and sales are for gross tons, f.o.b. cars, Pittsburgh, unless otherwise stated.

Coke.—While appraisements are still being made at the different coke plants in the Connellsville and other regions that are scheduled to be absorbed, the general impression continues strong that this consolidation is not feasible, if the prices named in the options given by the different coke concerns are to be maintained. General conditions in the coke trade are showing steady improvement, and the Frick Coke Company has recently blown in upward of 3000 ovens that have been idle for nearly two years. The Oliver & Snyder Steel Company, the Struthers Coal & Coke Company, and other concerns are also starting up idle ovens. Output of coke in the Upper and Lower Connellsville regions last week amounted to 299,486 tons, an increase of 7800 tons over the previous week, and the largest output in any one week for more than a year. Prices of coke are firmer, but standard makes of furnace coke can still be had at about \$1.55 to \$1.60 in net tons, at oven, while on contracts for last half of the year \$1.75 is now being generally quoted. Most consumers of furnace coke are covered for last half of the year, some very large contracts having been made recently. Standard makes of 72-hr. foundry coke are held at \$1.80 to \$1.90 in net tons, at oven, for prompt shipment, while on contracts for delivery over last half of the year from \$2.10, and as high as \$2.50 is being quoted.

Cincinnati.

CINCINNATI, OHIO, June 23, 1909.—(By Telegraph.)

Late developments in the pig iron field indicate some important stirrings in finished lines, and the feeling is therefore for a firmer market in all branches that enter into manufacture. Selling agents recently returned from the Southern furnace field report iron makers there in good condition, particularly as to stocks—in this respect rather better off than iron masters in the Northern district. The steel makers seem to be most prominent this week and the largest inquiry in this market to-day, aside from the rumored one of a very heavy tonnage desired by the largest pipe making interest, is from a Northwestern steel maker. Malleable is also coming into notice. More local foundries are in the market and the movement of coke is quite satisfactory.

Pig Iron.—The Southern market is undoubtedly firmer to-day, and the range is \$11.50 to \$12 for No. 2 foundry for immediate shipment and third quarter, with a strong tendency to favor the latter price for any delivery prior to January 1. A telegram this afternoon to a large selling interest added two more furnaces to the \$12 column. The attitude of the largest pipe making interest, which is understood to be seeking a heavy tonnage for last quarter delivery, is helping to make the situation stronger for the furnaces. The smaller buyers are getting in their orders now and the aggregate of the week's sales will be quite heavy. One Southern Ohio furnace interest has advanced its price for

any delivery to \$15, and the range on iron in this district is \$14.50 to \$15 for the balance of the year. Low grades, No. 4 foundry and forge, are still held at a little premium. A sale of 1000 tons of No. 4 foundry at \$11 for third quarter is noted, although the demand on forge would seem to have lessened since offers to melters at \$10.25 were rejected. The best inquiry to-day is from Chicago territory—3000 to 5000 tons of Bessemer for third quarter delivery to a Michigan steelmaker. A late inquiry is for 1500 tons of malleable for the last half from a St. Louis manufacturer. Malleable is quoted here at about \$15.25, Valley, and \$14.50 to \$15, Ohio furnace. A large St. Louis car wheel manufacturer is reported to have bought 1000 tons of car wheel iron. A large Indiana manufacturer is understood to be offering \$14 to \$14.50 for a good sized tonnage of malleable for delivery early next year, but without success. The local foundry which has been in the market for several weeks for 1000 tons of analysis iron, divided between Northern and Southern, it is expected to close to-day. An inquiry from Detroit territory is for 1000 tons of No. 2 foundry and some low phosphorus iron. A number of scattered inquiries from melters in all directions range from 100 to 300 tons. A sale in which local agents were interested was of 7000 tons of foundry iron, largely No. 2, to a Chicago foundry interest, at a specially attractive price for delivery over the remainder of the year. A local foundryman is credited with a purchase of No. 3 foundry iron at \$10.50, Birmingham. A recent sale of Southern iron to a Pittsburgh concern at \$16.40, delivered, establishes a new value on this product as compared with Valley and other irons at current prices. For early delivery and third quarter, based on freight rates of \$3.25 from Birmingham and \$1.20 from the Hanging Rock District, we quote f.o.b. Cincinnati as follows:

Southern coke, No. 1 foundry.....	\$15.25 to \$15.50
Southern coke, No. 2 foundry.....	14.75 to 15.00
Southern coke, No. 3 foundry.....	14.25 to 14.50
Southern coke, No. 4 foundry.....	14.25
Southern coke, No. 1 soft.....	15.00 to 15.50
Southern coke, No. 2 soft.....	14.50 to 15.00
Southern coke, gray forge.....	13.75 to 14.00
Ohio silvery, 8 per cent. silicon.....	19.70
Lake Superior coke, No. 1.....	15.95 to 16.20
Lake Superior coke, No. 2.....	15.70
Lake Superior coke, No. 3.....	14.95 to 15.20
Standard Southern car wheel.....	22.25 to 23.25
Lake Superior car wheel.....	21.75 to 22.75

(By Mail.)

Coke.—A satisfactory volume of business is moving and contracting is in progress for a considerable amount of foundry coke, while a few furnaces are still negotiating for their year's supply of those grades. Reports from the ovens indicate that stocks of coke on track have all been cleaned up and the trade is in a healthy condition. Connellsville foundry is quoted on contract from \$2 to \$2.25. The first price has been shaded a trifle on spot business, but on outside brands. Connellsville furnace coke is quoted at \$1.60 (the spot price) to \$1.85 on contract. Wise County grades are on the same basis, with the \$2 price firm on spot business. Pocahontas foundry is quoted from \$2 to \$2.10, with the former price shaded a trifle for spot delivery. The price on furnace grades is about \$1.75.

Structural Material.—The outlook is regarded by constructing engineers and architects as good. The new Orpheum Theater, the largest in Cincinnati, to be built in Walnut Hills, will take 475 tons of structural steel. This will be furnished by the W. F. Potthoff Company of this city. The shapes were picked up at different mills, such as could give immediate delivery. The Merchants' Heat & Light Company, Indianapolis, Ind., is reported in the market for steel for a new power house, which will require about 900 tons. On structural shapes the average price here is 1.35c., Pittsburgh. One large interest is asking 1.40c. on less than carload lots.

Bars and Sheets.—Business on bars, both steel and iron, is very good, and the quoted price, 1.25c., Pittsburgh, on steel bars, is reported as subject to an advance almost any day. There is no stable price on iron bars, and the higher range of 1.35c. to 1.45c., Pittsburgh, following the action of some Eastern bar makers in advancing the price, finds no response here. These figures are being shaded considerably on desirable specifications. Sheet mills in this territory are running full. The Newport Rolling Mill Company, at Newport, Ky., has all 10 mills in operation. This company is having a heavy run on its black and galvanized open hearth iron sheets, to which it is devoting considerable attention. It is difficult to quote a fixed price on black and galvanized sheets, as prices are being adjusted to comply with certain conditions, each a law to itself. Business with one of the largest interests has been good in the South, a recently returned salesman reporting unusually heavy demand in the extreme South and Southwestern territory. All mills employing organized labor in the Central West are making up stock, and running for the most part to their capacity, anticipating a shutdown July 1.

Old Material.—Dealers report a weaker market for the most part, though quotations are not changed. All large dealers have bought liberally of railroad offerings, and confidence is expressed for the future. No single item in the list is receiving any special attention, and sales for the most part are made up of small lots. For delivery, f.o.b. cars Cincinnati, we quote as follows:

No. 1 R. R. wrought, net ton.....	\$14.50 to \$15.00
Cast borings, net ton.....	6.75 to 7.25
Heavy melting steel scrap, gross ton...	13.50 to 14.50
Steel turnings, net ton.....	9.00 to 9.50
No. 1 cast scrap, net ton.....	13.50 to 14.00
Burnt scrap, net ton.....	9.50 to 10.50
Old iron axles, net ton.....	17.50 to 18.00
Old iron rails, gross ton.....	15.00 to 15.50
Old steel rails, short, gross ton.....	13.50 to 14.00
Old steel rails, long, gross ton.....	13.50 to 14.00
Relaying rails, 56 lb. and up, gross ton...	21.50 to 22.00
Old car wheels, gross ton.....	14.50 to 15.00
Low phosphorus scrap, gross ton.....	14.00 to 14.50

Cleveland.

CLEVELAND, OHIO, June 22, 1909.

Iron Ore.—Although a few sales are reported, the market generally is quiet. Some inquiries are still coming in, among them being one from the East for a round tonnage. Many consumers have as yet bought no ore for this season's delivery, and do not seem disposed to buy for some time, having enough on hand to last them several months. It is the general opinion that the buying will drag along two or three months, somewhat the same as last year, and that some of the furnace interests will delay covering for their requirements until late in the summer. The situation, however, shows a decided improvement over this time a year ago, when practically no sales had been made, and the general outlook leads the merchant ore firms to the belief that the aggregate tonnage sold before the season is over will be quite satisfactory. More boats are in commission than are needed to move the ore now being shipped. Vessel tonnage has been chartered for about all the ore that has been sold and wild cargoes are scarce, although some are being furnished by the Steel Corporation. Ore prices at Lake Erie docks, per gross ton, are as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—The market shows more inquiries, but little iron was sold in this district during the week. Prices continue firm, the minimum quotation for No. 2 foundry for last half delivery being \$15 in the Valley, and local furnaces are adhering to that price at furnace for outside shipment. A sale of 500 tons of No. 2 was made by a local furnace to a local consumer at \$15.25, delivered. A local interest reports the sale of considerable foundry iron in the Pittsburgh District at \$14.75 to \$15, at furnace for the last half. Included in these sales were a few lots between 500 and 1000 tons and several from 200 to 500 tons. The same interest also sold 1000 tons of forge iron in the Pittsburgh District at \$14, at furnace. Some inquiries have come out for foundry iron for the first half of 1910 delivery, but the most of the furnaces are not disposed to quote that far ahead. A local interest recently sold a small tonnage of No. 2 for first half delivery at \$15, at furnace, but has advanced its price to \$15.50. In only a few cases are shipments on contracts being held up. Among the inquiries is one from a Canton, Ohio, consumer for 1000 tons of basic, for third quarter delivery. We quote, delivered, Cleveland, for the last half, as follows:

Bessemer	\$16.15
Northern foundry, No. 1.....	\$15.75 to \$16.00
Northern foundry, No. 2.....	15.25 to 15.50
Northern foundry, No. 3.....	14.75 to 15.25
Southern foundry, No. 2.....	15.60 to 16.10
Gray forge.....	14.25 to 14.50
Jackson County silvery, 8 per cent. silicon.....	20.05

Coke.—The market is very quiet in both furnace and foundry grades and prices show no improvement. We quote standard Connellsville furnace coke at \$1.50 to \$1.65 per net ton for spot shipment and \$1.70 to \$1.75 on contract for the last half. Best makes of 72-hr. foundry coke are held at \$1.80 to \$2 per ton for spot delivery and \$2 to \$2.25 for the last half.

Finished Iron and Steel.—Although not quite as heavy as during the few preceding weeks, the mill agencies report a good volume of specifications in the past week, the bulk of the tonnage being for steel bars, plates and structural material. The leading producer is getting further behind on deliveries, but other mill agencies appear to be about holding their own. As most of the consumers are under contract not much new business in steel bars is coming out, and the bulk of the new orders is being taken by the leading interest that is still quoting the 1.20c., Pittsburgh, price, or \$1 a ton lower than the independent mills. Prices on plates and structural material are being maintained at 1.30c., Pittsburgh. The demand for both continues good, although not much new business is coming out. No additional building projects requiring a large structural tonnage are expected to come out here during the next few weeks, but fabricators have considerable small work on hand and are specifying freely on contracts. One or two mills have been unable to make deliveries on structural material for local buildings in the course of erection within the time specified, and fabri-

ators have been forced to buy a portion of their material from other mills at advances. Some agencies are taking orders for small lots of shapes that they can fill promptly from stock at premium prices. The demand for sheets is improving, but jobbers complain that orders are not very plentiful from the small consumers. Some of the mills are taking sheet contracts for delivery until October 1, but are unwilling to sell beyond that date. Sheet prices are firmer, the regular prices being more generally adhered to, although some mills are making a concession of \$1 a ton on galvanized sheets. The demand for iron bars shows considerable improvement, the prospective shutdown of the mills in July having brought out a number of orders, and local mills have all the business they can turn out before they close down on July 3. Local mills have advanced their price on iron bars \$1 a ton, and are now holding firmly to 1.35c., Cleveland. Mills report an improvement in small orders from railroads for repair work. The demand for shafting continues fairly good.

Old Material.—The market is very quiet, no sale of large size or inquiries for large tonnages being reported during the week. The local bar iron mills will shutdown July 3 for repairs, and probably will not start up until the wage scale is settled. They are entirely out of the scrap market, and steel mills are buying very little. Quotations are largely nominal, and dealers would have to make concessions to effect sales. While dealers see little prospects of a firmer market in the near future, those who can seem inclined to hold their scrap for better prices. The Lake Shore Railroad will close June 25 on a list of about 500 tons. Dealers' prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$15.00 to \$15.50
Old iron rails.....	16.50 to 17.00
Steel car axles.....	19.00 to 19.50
Old car wheels.....	15.00 to 15.50
Heavy melting steel.....	14.00 to 14.50
Relaying rails, 30 lb. and over.....	21.50 to 22.50
Agricultural malleable.....	12.50 to 13.00
Railroad malleable.....	14.00 to 14.50
Light bundled sheet scrap.....	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$17.50 to \$18.00
Cast borings.....	6.50 to 7.00
Iron and steel turnings and drillings.....	8.50 to 9.00
Steel axle turnings.....	9.50 to 10.00
No. 1 bushing.....	12.00 to 12.50
No. 1 railroad wrought.....	13.50 to 14.00
No. 1 cast.....	12.50 to 13.00
Stove plate.....	10.50 to 11.00
Bundled tin scrap.....	10.00 to 10.50

Philadelphia.

PHILADELPHIA, PA., June 22, 1909.

The market continues strong, and while buying has diminished in some lines, prices are being well maintained and in instances show an advancing tendency. A fairly even volume of business has been transacted, though the same relative gain noted last month is lacking. Considerable encouragement is taken from the increased demand on the part of the railroads, although the requirements in the way of rolling stock, particularly that of the Pennsylvania Railroad, have been greatly exaggerated. The restoring of wages on the part of a number of industrial concerns to the basis prevailing before the wholesale reductions in the spring is a favorable factor and indicates returning prosperity. Shipbuilding shows increasing activity and further bridge and viaduct work have been placed in the week. The forward movement in finished materials is comparatively good, and Eastern mills show steady gains, without boom indications. While developments during the summer months will probably be on a moderate scale, a more active market is expected early in the fall.

Pig Iron.—There has been a fair movement in foundry grades. Steel making irons, however, have been quieter and outside of one transaction in low phosphorous iron, no business has been reported. The smaller buyers have been taking No. 2 X and No. 2 plain foundry iron quite freely. The lots as a rule are small, however, running from carloads to a few hundred tons, a good portion being for prompt shipment, at \$16.50, delivered, for No. 2 X spot and third quarter. Sellers in a number of cases ask 25 cents advance for last half shipment, while a few quote 50c. advance for strictly fourth quarter iron. Little business has been done for the latter delivery, one sale of 300 tons being reported at \$16.75, delivered. Sellers in some instances are not adhering firmly to the advances asked if desirable business is to be had slightly below those figures. There is fair inquiry for foundry irons, the most important being that of the Pennsylvania Railroad for 1500 tons of coke iron with 2.50 silicon, 4500 tons of car wheel iron and 2100 tons of charcoal iron, bids for which go in to-day. Sales of Southern foundry iron have not been very active, although a cast iron pipe foundry in this territory brought several thousand tons of low grade iron at the market. Virginia foundry irons have been moderately active. Sales of the higher grades have been mostly in small lots for delivery extending over the next three months at \$13.75 to \$14, furnace. One sale of several thou-

sand tons of Virginia pipe iron for local consumption is reported, the transaction being based on \$10.50, Birmingham, for gray forge. Some demand for forge iron is noted, one inquiry for several thousand tons being now before the trade. While \$15.25 is about the average price, some sellers hold for an advance of 25 cents a ton. Basic is quiet, consumers apparently having covered for their present requirements. A number of sellers are holding this grade at prices 25c. to 50c. above the basis on which business was recently done. But one sale of low phosphorous iron was reported in the week, 3000 tons for near future delivery being sold at prices equal to about \$20, delivered here. Quotations are unchanged, and while higher figures are being talked of, no material advance is likely in view of the large capacity still idle in this district. For prompt and third quarter delivery in buyers' yards, eastern Pennsylvania and nearby points, prices for standard brands range as follows:

Eastern Pennsylvania, No. 2 X foundry.....	\$16.50 to \$16.75
Eastern Pennsylvania, No. 2 plain.....	16.00 to 16.25
Virginia, No. 2 X foundry.....	16.50 to 17.00
Virginia, No. 2 plain.....	16.25 to 16.75
Gray forge.....	15.25 to 15.50
Basic.....	15.50
Low phosphorous.....	19.50 to 20.00

Ferromanganese.—Prices show a stiffening tendency, particularly for delivery over the first half of next year. Some small business has been done for delivery during the last half of this year on the basis of \$41, f.o.b. Baltimore. One inquiry for 1000 tons, for delivery over one year from July 1, is up, while small lots for the first half of 1910 have been sold at slightly higher figures, quotations for this delivery now ranging from \$42 to \$43, f.o.b. Baltimore.

Billets.—Some moderate business for prompt shipment has been done, and consumers are feeling the market more actively for forward deliveries. Prompt billets are still quoted at \$25 to \$25.50, delivered in this territory, while for forward delivery, extending over the last half of the year, an advance of \$2 a ton continues to be asked. Forging billets take the usual advance of \$2 a ton over prices for ordinary billets, the usual extras applying for high carbons and special sizes.

Plates.—Mills report a better volume of business; specifications on old orders are also reported heavier and the situation on the whole shows improvement. Orders have been taken for pretty fair tonnages of boat, bridge and boiler steel, and several round lots are still before the trade. The railroads are also taking hold more aggressively and mills are slowly increasing production. Prices while unchanged are much stronger, and there is considerable talk of an advance in the near future. For prompt shipment ordinary plates are quoted at 1.45c. to 1.55c., delivered in this territory, the usual extras applying.

Structural Material.—The city has awarded the contract for the Passayunk avenue bridge over the Schuylkill River to the Strobel Steel Construction Company, Chicago. It is to be made of the bascule type, and will require about 2600 tons of structural material. Bids have also been received for considerable bridge work for the Philadelphia & Reading elevated work, but contracts for the same have not yet been placed. There is a fairly good run of miscellaneous business for plain shapes, and some mills, which are pretty fully engaged, will not accept tonnage for forward delivery at present prices, which for delivery in this territory range from 1.45c. to 1.55c., according to specification, but show an advancing tendency.

Sheets.—The situation is decidedly stronger, a better volume of business is reported, and mills in this territory are pretty fully engaged. Sellers, as a rule, will not accept business for extended forward delivery at present prices, which for prompt shipment in this territory range as follows: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c.; No. 28, 2.80c.

Bars.—There is a fair demand, consumers in a number of instances placing business to cover requirements over the usual midsummer suspension of mills. The situation, on the whole, is stronger and better prices are asked and obtained by some makers. For prompt shipment leading makers quote refined iron bars at 1.45c. to 1.50c., delivered, in this territory. Steel bars range from 1.35c. to 1.45c., delivered.

Coke.—The movement in coke has been rather light. Some few contracts for requirements over the last half of the year have been closed for foundry coke at unchanged prices. The tone of the market, however, is somewhat stronger. Furnace coke has been rather dull, immediate requirements in nearly all cases being fully covered. Quotations for delivery in this territory range about as follows:

Connellsville furnace coke.....	\$3.90 to \$4.10
Foundry coke.....	4.35 to 4.50
Mountain furnace coke.....	3.50 to 3.70
Foundry coke.....	3.80 to 4.10

Old Material.—The volume of business transacted has been somewhat smaller, although prices are firm and the market is strong. Several sales of 500-ton lots of heavy melting steel for prompt delivery are reported at \$16, delivered, but there has been no movement in heavy tonnages, as dealers still refuse to sell large blocks. The rolling mills

are not very active buyers, owing to the approaching mid-summer suspension of plants. Prices for practically all grades of old material are unchanged and range about as follows for delivery in buyers' yards, Eastern Pennsylvania and nearby points:

No. 1 steel scrap and crops.....	\$16.00 to \$16.50
Low phosphorus.....	20.00 to 20.50
Old steel axles.....	20.50 to 21.50
Old iron axles.....	22.50 to 23.50
Old iron rails.....	19.50 to 20.50
Old car wheels.....	15.00 to 15.50
Choice No. 1 R. R. wrought.....	18.00 to 18.50
Machinery cast.....	15.00 to 15.50
Railroad malleable.....	14.00 to 14.50
Wrought iron pipe.....	15.50 to 16.00
No. 1 forge fire scrap.....	13.00 to 13.50
No. 2 light iron.....	9.00 to 9.50
Wrought turnings.....	12.50 to 13.00
Stove plate.....	12.00 to 13.00
Cast borings.....	10.50 to 11.00
Grate bars.....	13.50 to 14.00

Metal Market.

NEW YORK, June 23, 1909.

Copper.—For the first time in a number of weeks the Metal Exchange yesterday and to-day quoted electrolytic copper below 13c., the price established there to-day being 12.87½c. This should not be considered the market price, however, as it is believed buying would put electrolytic copper at 13c. and perhaps a trifle higher. The absence of buyers from the market in the past week has reduced the price, but the decline was so gradual and the successive reductions so slight as to indicate that they were made by holders of small lots rather than with a view to encouraging buyers into the market than to establish those prices on any considerable amount. The London market steadied somewhat, but from all accounts little was bought for consumption. Prominent selling agencies and producers have sold their output for the next two months, and they are giving but little support to the market. Quotations made by sellers were in most cases from people who had but little to offer. All things considered, the market is on a fairly good basis, and both buyers and sellers agree that on any demand for the metal higher prices would be made. Lake copper is quoted at 13.25c. The London market to-day was quoted at £58 12s. 6d. for spot and £59 10s. for futures, and the market was firm and somewhat stronger than yesterday. The exports continue heavy, and to date this month 2445 tons have been sent abroad.

Pig Tin.—A very dull market prevails. Most consumers of spot tin for immediate shipment made their contracts some time ago and most of the buying that is now being done is of the hand to mouth order. Even important consumers who are in need of the metal are buying it as they use it and the important sellers have no great confidence in the situation. It is the consensus of opinion that the tin plate manufacturers have the labor situation well in hand and they do not think that the shutdowns will affect the market to any great extent. On June 18 there was some buying, which sent the market up a few points, but it fell off again and yesterday and to-day there were no transactions of any account. Buying prices established during the week were as follows:

	Cents.
June 17.....	29.25
June 18.....	29.40
June 21.....	29.30
June 22.....	29.05

In London the market has been weak and there has been a gradual decline. Export tin sold to-day for £133, and futures were quoted at £134 10s. The sales of spot were 230 tons and of futures 120 tons. The tin afloat amounts to 2331 tons.

Lead.—There are few transactions, but the market is firm at 4.35c., New York. This price is maintained by the American Smelting & Refining Company, and outside interests are asking about the same. Lead in St. Louis was quoted to-day at 4.20c., and the market there is considered weak.

Spelter.—The market is firm, and 5.40c. is generally quoted, but sales have been reported at something less. In the week the demand fell off considerably, and for two or three days the market was not very stable. An increased demand yesterday both here and in St. Louis created a better feeling among the sellers, and to-day 5.27c. was given as the price at St. Louis, which is a trifle higher than quotations of Monday and Tuesday.

Antimony.—There is so little buying that the scarcity of Hallett's has not affected the ruling price, which is 7.50c., but some traders claim that it would be difficult to buy any great amount at less than 7.75c. We quote Cookson's at 8.25c. and the outside brands at 7.25c.

Tin Plate.—Prices are stationary and there is little trading. The threatened shutdown at the mills seems to have had no effect on the market and quotations for 100 lb. I C coke plates are \$3.64.

Old Metals.—The following dealers' selling prices represent the New York market:

	Cents.
Copper, Heavy Cut and Crucible.....	12.75 to 13.00
Copper, Heavy and Wire.....	12.50 to 12.75
Copper, Light and Bottoms.....	11.50 to 11.75
Brass, Heavy.....	9.25 to 9.50
Brass, Light.....	7.50 to 7.75
Heavy Machine Composition.....	11.75 to 12.00
Clean Brass Turnings.....	8.25 to 8.50
Composition Turnings.....	9.75 to 10.25
Lead, Heavy.....	4.20 to 4.25
Lead, Tea.....	3.90 to 3.95
Zinc, Scrap.....	3.75 to 4.00

The Corporation Research Laboratory.—Some time since an appropriation approximating \$100,000 was made by the United States Steel Corporation to provide for the building and the initial apparatus for a research laboratory for iron and steel. The laboratory will be built by and will be under the fostering care of the Carnegie Steel Company, but its activities will extend over the entire field of the constituent companies of the United States Steel Corporation. The details are now being worked out under the supervision of A. C. Dinkey, president of the Carnegie Steel Company. It will be under the direct charge of John Unger, who has been at the head of the armor plate department at Homestead and has been assistant superintendent of the Homestead Works. The building will be erected on the bluff back of the river between Homestead and Duquesne.

The following directors were elected at a special meeting of the stockholders of the Lake Superior Corporation held in Camden, N. J., June 9: J. Tatnall Lea, R. L. Austin, F. M. Owen, Philadelphia; J. S. Dale, John T. Terry, Jr., L. N. Lovell, New York; T. J. Drummond, C. D. Warren, J. F. Taylor, Walter Gow, Toronto; W. K. Wigham, London, and H. Coppel, New Jersey. The officers were re-elected with the addition of J. F. Taylor as third vice-president.

Michael Blake and A. Gordon Murray, receivers of the J. B. & J. M. Cornell Company, New York, have received authority to continue the business for 60 days. The receivers have borrowed \$75,000 on receivers' certificates and have incurred other liabilities of \$55,793. The receivers expect to continue to show a profit; between March 22 and April 30 it was \$8099. It is expected that plans for reorganization will be taken up in the next 60 days.

The Board of Boiler Rules of Massachusetts, 15 Ashburton place, Boston, is asking for an expression of opinion "as to the advisability of making provision in the rules to take into consideration the yield point of steel, when the lowest yield point is stamped on the plates (in addition to the stamps of tensile strength), for calculating the maximum allowable working pressure on shells and drums hereafter constructed."

Bids for construction of the two battleships Arkansas and Wyoming, authorized by the last Congress, will be opened at the Navy Department on August 18. These ships will be of the Delaware type of 20,000 tons or more displacement. The specifications ask for bids on turbine engines, but bidders will be allowed also to submit proposals for a combination of turbine and reciprocating engines.

The car requirements of the Pennsylvania Railroad have not yet been decided. The newspaper report that the company is in the market for 35,000 cars is untrue and was evidently based on another report, also incorrect, that the company contemplated scrapping 35,000 old cars which it had on sidings.

The presidential address of Dr. Charles B. Dudley at the meeting of the American Society for Testing Materials at Atlantic City, N. J., Tuesday evening, June 29, will be on "Engineering Responsibility."

Dominion Iron & Steel Company.

At the annual meeting of the Dominion Iron & Steel Company at Montreal, Canada, June 16, the report for the fiscal year ending May 31 was presented, showing gross and net profits as follows, with the changes from the showing for the preceding year:

	1909.	Changes.
Gross profits.....	\$2,225,835	Decrease \$387,990
Interest charges.....	654,423	Decrease 42,361
Net profits.....	\$1,571,412	Decrease \$345,629

Included in the interest charges for the year was \$150,000 paid on the floating indebtedness caused by the action of the Dominion Coal Company. With no allowance for the recovery of that sum the total surplus is \$2,099,801. The report says that the payment of \$2,750,000 on account made by the Dominion Coal Company since the award resulting from the litigation leaves a balance of \$1,201,093 still to be adjusted. President Plummer said that the greater part of this additional claim is beyond question.

The balance sheet as of May 31 shows cash on hand and in bank amounting to \$225,587, accounts receivable \$1,751,128, inventories \$1,640,294, cost of properties \$34,587,232, deferred charges \$22,831, total assets \$38,427,072. Among the liabilities are \$458,624 accounts payable, bond interest accrued \$171,083, reserve and provisions \$1,679,730, bonds outstanding \$9,017,833 and a profit and loss surplus of \$2,099,801. The capital stock is given at \$20,000,000 common and \$5,000,000 preferred.

Embodied in the annual report is a statement by Engineer Frank Merrick with regard to the extent of the company's iron ore areas at Wabana, N. F., which says in part:

The land area is estimated to contain 17,750,000 tons and the first submarine 90,650,000 tons, a total of 108,400,000 tons. In this estimate no account is taken of the second submarine area, as at present it is impossible to form any idea of the quantity and quality of ore it contains. The cost of mining at present and within any reasonable time is likely to remain so low that the ore can be mined to yield a handsome profit, either by converting it into pig iron at the works at Sydney or by selling it in the open market.

With regard to the business outlook the report says:

The depression in business which marked the past financial year would have been more severely felt both in the output and the earnings of the company had it not been that we were able to keep the plant in full operation by the exportation of the production in excess of home requirements. The prices obtained during the year generally showed a marked falling off as compared with previous years, but there is now a distinct improvement in home demand, and your directors look forward to better results in the year on which we have just entered.

Prosperity of the New England Wire Trade.

The wire industry of New England is at practically maximum capacity. There appears to be no exception to this. The works of the American Steel & Wire Company at Worcester, Mass., are running at 100 per cent. production, the demand being practically equally strong through all departments, which means a very widely diversified market, as a very large per cent. of the company's fine wire products are manufactured in this plant. The New Haven plant, formerly that of the National Steel & Wire Company, is running full, with the exception that the rod mill is idle. The new rope mill is practically completed and is running in part. It will produce plow steel and crucible steel rope and hoisting rope. The large independent wire mills are very busy. The manufacturers of wire goods report that their factories are up to full capacity. In at least two of the largest of the Worcester factories production is exceeding any previous record, and deliveries are less prompt than they have ever been. The greatest confidence is apparent all through the wire and allied trades, and already there is speculation as to how the market will be cared for when the country as a whole shall have returned to better than average conditions.

Beginning this week the Bessemer steel plant of the Youngstown Sheet & Tube Company, at Youngstown, Ohio, will be operated to its full capacity. For some

little time the company has been running its other departments full, but has never pushed its steel plant to its utmost since putting in operation its two blast furnaces, from which it uses hot metal. It is also of interest to note that the Youngstown Sheet & Tube Company maintained wages during the period of depression, being one of the few steel companies that did not reduce wages of any of its employees.

Industrial Accidents in Pennsylvania.

HARRISBURG, PA., June 19.—A remarkable increase in the number of boilers inspected by State agents is reported in the annual review for 1908 just made by Chief Factory Inspector John C. Delaney. In 1905, when the Pennsylvania Boiler Inspection law went into effect, the number of boiler inspections was but 479; in 1908 it was 16,123, an increase of 15,644 in four years. Captain Delaney says that the inspections, with comparatively few exceptions, were made by casualty companies, the owners of boilers preferring an inspection that would enable them to take out a policy of insurance. But two explosions are noted, one at the plant of the Susquehanna Iron Company in York, on August 10, and the other in the establishment of the Welch Bright Company, at Monaca, Beaver County, on February 3. The chief inspector says on the general subject of accidents in industrial establishments: "One hundred and fourteen fatal and 336 serious accidents occurred in or about industrial establishments. The total was 298 less than for the year 1907. The falling off can be attributed, in part, to the dull times, and in greater part to the constant installation of safety appliances. Blast furnaces and rolling mills, though not contributing their usual quota of fatal and serious accidents, are, nevertheless, adding constantly to the number of victims. Employment in either of these establishments is, under the best conditions, extra hazardous, but if the men in charge of the employees would lessen the rush and hurry now incident to the employment, and if the employees would exercise greater care of themselves and for their co-employees much of the hazard would be minimized. Employees were to blame themselves for very many of the accidents occurring in industrial establishments. The reports show a reckless disregard on the part of the injured for any and all forms of danger."

A complaint was filed with the State Railroad Commission at Harrisburg last week by T. J. Maloney of Pittsburgh against the Pennsylvania and other railroads in Pittsburgh, charging discrimination against Pittsburgh shippers in the handling of car freight from one point in the city to another. The complaint was first sent to Washington and laid before the Interstate Commerce Commission and by that body returned with the recommendation that it go to the State Railroad Commission at Harrisburg, since the issue affects shippers in Pennsylvania only. Mr. Maloney states that a car of freight loaded at Duquesne Station in Pittsburgh and shipped to Lawrenceville yards, is charged for at the tonnage rate—that is, it costs from \$10 to \$12 a car for this transfer from one point to another in the city. In Cleveland, Buffalo and most other cities, it is stated, only a switching charge is made on these transfers within the same city, or \$2.50 a car. Mr. Maloney is a scrap iron shipper, and his specific complaint is based on the charge of from \$10 to \$12 a car for a transfer of freight by car from Pittsburgh yards to the yards of the North Side, or old Allegheny.

The blast furnace superintendents of the Carnegie Steel Company gathered at the Ohio Works, Youngstown, Ohio, June 15, for a regular quarterly meeting. The visitors were shown around the plant by J. C. Barrett, local superintendent. Representatives were present from Donora, Braddock, Mingo Junction, Clairton, Duquesne, New Castle, Sharon and Niles. Matters pertaining to blast furnace operation and the inspection of new machinery in the open hearth department consumed most of the time.

New York.

NEW YORK, June 23, 1909.

Pig Iron.—There is persistent and steady buying in nearly all branches of the pig iron trade, and the markets are firmer. There has been some further covering by cast iron pipe makers on contracts closed by them, including one round block at Buffalo. We quote \$16.75 to \$17 for No. 1 Northern foundry, \$16.25 to \$16.50 for No. 2 foundry, ad \$15.50 to \$15.75 for No. 2 plain, at tidewater. Alabama iron is quoted at \$16.25 to \$16.50 for No. 1 foundry and \$15.75 to \$16 for No. 2 foundry.

Steel Rails.—Details of the allotment of the Harriman order are published elsewhere. Apparently the whole amount has not yet been covered. It is worthy of note that this business is for delivery during the last quarter.

Bars.—The market is firm, and in steel bars the deliveries now promised are from four to six weeks with most mills. On third quarter business 1.41c., New York, is generally maintained, though one interest is still taking an occasional prompt delivery order at 1.20c., Pittsburgh, or 1.36c., tidewater. The bar iron situation is unchanged. While mills are running fuller, prices are not as strong as some recent announcements of advances might imply. We continue to quote 1.40c. to 1.45c., tidewater. The New York trade is interested in the negotiations looking to the consolidation of several iron rolling mills in Central Pennsylvania.

Ferroalloys.—One large independent steel interest bought 2000 tons of ferromanganese a few days ago, and there is an inquiry for an equal amount from another, while there have been a number of sales of round lots. The market is considered firm at \$42. The situation regarding ferro-silicon has cleared up somewhat, and while there have been so few transactions that it is hard to establish a definite price, we quote \$61 to \$62, New York.

Structural Material.—The fabricating companies are generally well supplied with summer work, and as the structural mills are asking an advance over spring prices for material, bids on work now coming out show that the fabricators are looking more to a profit on what they take on. The capacity of the leading company is about two-thirds active; some of its plants, as Ambridge and Pencoyd, are running practically full. It is noticed that while smaller work is not so plentiful the large jobs pending keep up the volume of business in sight. In the past week the American Bridge Company has booked about 8000 tons and other shops about 15,000 tons—these figures taking account of work large enough to be generally bid on. In the East a number of small contracts for bridge work were let last week. On the large work pending, including the Pennsylvania Terminal post office, the St. Paul Railroad inquiry for 12,000 tons for bridges, the American Bank Note Company's building in New York, 4000 tons, the Mississippi River bridge at St. Louis, 25,000 tons, and the Vanderbilt Hotel in New York, 5000 tons, no decisions have been reached as to the destination of the steel work. We quote beams and channels up to 15 in. wide at 1.41c. to 1.46c., tidewater, on shipments from mill, and material sold from stock and cut to length, at 1.70c. to 1.75c.

Old Material.—Dullness has come over the market, partly that of the summer season and partly that which indicates that mills and foundries have supplied their wants for a reasonable time ahead. In some cases shipments of scrap to steel works have been held up and there are indications that consumers have obtained fair supplies of scrap direct from the railroads. While a more active market, possibly with advancing prices, is looked for in the fall, the indications point to only a moderate amount of business in old material during the summer. The foundry demand is somewhat better than that from the mills, a number of transactions being reported for the week in cast scrap. The belief that the scrap market has been out of step with the pig iron market for some time prevents buyers from taking any interest in old material beyond their immediate necessities, which in no case appear to be urgent. Under the present relation of prices the use of pig iron by steel works and foundries is likely to be increased at the expense of scrap. Our quotations have been reduced slightly and are as follows, per gross ton, for delivery in New York and vicinity:

Old girder and T-rails for melting	\$12.50 to \$13.00
Heavy melting steel scrap	12.50 to 13.00
Relaying rails	20.00 to 20.50
Old iron rails	15.00 to 15.50
Standard hammered iron car axles	19.00 to 19.50
Old steel car axles	17.50 to 18.00
No. 1 railroad wrought	15.00 to 15.50
Iron track scrap	13.00 to 13.50
No. 1 yard wrought, long	13.50 to 14.00
No. 1 yard wrought, short	12.50 to 13.00
Light iron	8.00 to 8.50
Cast borings	8.50 to 9.00
Wrought turnings	9.50 to 10.00
Wrought pipe	12.50 to 13.00
Old car wheels	14.50 to 15.00
No. 1 heavy cast, broken up	13.00 to 13.50
Stove plate	11.00 to 11.50
Locomotive grate bars	10.50 to 11.00
Malleable cast	14.00 to 14.50

Iron and Industrial Stocks.

NEW YORK, June 23, 1909.

The average daily volume of business on the New York Stock Exchange has been less in the past week than for many weeks preceding. There was no recovery in the latter part of last week from the settling of values which came earlier in the week. At the beginning of the present week, on the contrary, a sharp decline occurred in which the iron and steel shares participated. In Steel common the net loss Monday was 2½ and in the preferred 2¼. The range of prices in the four business days ending with Monday of this week on the active industrial stocks was as follows:

Allis-Chalm., com.	15¼-15¾	Pressed St., pref.	103¾-103¾
Allis-Chalm., pref.	51¼-52¼	Railway Spr., com.	42½-43¾
Beth. Steel, com.	28-29½	Railway Spr., pref.	105
Beth. Steel, pref.	59¼-60	Republic, com.	29¼-30¾
Can, com.	11¼-12¾	Republic, pref.	*104-107
Can, pref.	81-82	Sloss, com.	80-82
Car & Fdry, com.	54¾-56	Pipe, com.	32¾-33¾
Steel Foundries	47¼-49	Pipe, pref.	83¾-85
Colorado Fuel	40¾-44	U. S. Steel, com.	64¾-67¾
General Electric	160-162	U. S. Steel, pref.	121-123¾
Gr. N. ore cert.	74¼-76¾	Westinghouse Elec.	83¼-85
Int. Harv., com.	84¾-85	Am. Ship, com.	60
Int. Harv., pref.	120¼-121¼	Cambria Steel	40-41¾
Locomotive, com.	57-59¾	Lake Sup. Corp.	22¾-26
Locomotive, pref.	117¼-117¾	Penna. Steel, pref.	109¼-110
Nat. En. & St. com.	16¾-17¼	Crucible St., com.	9¼-9½
Nat. En. & St. pref.	89¼-89¾	Crucible St., pref.	70-72½
Pressed St., com.	41¼-42¾		

* Ex dividend, 2 per cent.

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 65¾, preferred 123, bonds 105½; Car & Foundry common 55¾, preferred 116¼; Locomotive common 58¾, preferred 117¼; Steel Foundries common 48½; Colorado Fuel & Iron 42¾; Pressed Steel common 42, preferred 103¾; Railway Spring common 43; Republic common 30¾, preferred 104; Sloss Sheffield common 81; Cast Iron pipe common 32¾, preferred 84½; Can common 11½, preferred 81¼.

The report of the Crucible Steel Company of America for the quarter ending May 31, 1909, shows net earnings of \$556,343, against \$555,823 in the previous quarter and \$411,213 in the quarter ending November 30, 1908. The total net earnings for the nine months ending May 31 were \$1,523,380, while for the year ending August 31, 1908, a deficit was shown of \$520,024. The surplus June 1, 1909, was \$2,856,582. Chairman Du Puy says that in recent months there has been a steady improvement in the company's operations. Orders for the first half of June were almost double those in the same part of May. He added that the company's stocks of raw materials bought at low prices had increased in value by \$795,577.

Dividends.—The Crucible Steel Company of America has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable June 30.

The Youngstown Sheet & Tube Company has declared a quarterly dividend of 2 per cent., payable July 1, and a stock dividend of \$3,000,000, payable to stock of record June 15.

The Garvin Machine Company, New York, has declared the regular semiannual dividend of 3½ per cent. on the preferred stock, payable July 1.

The Chamber of Commerce of Spokane, Wash., and members of the United Metal Trades Association gave a luncheon June 5 to J. W. Van Cleave, James A. Emery and J. P. Bird, general manager of the National Association of Manufacturers. Messrs. Van Cleave and Emery addressed the 150 persons present on the promotion of the open shop. A similar gathering at Portland, Ore., Friday evening, June 11, was attended by 200. At Seattle, June 17, the same speakers addressed a banquet gathering representing the employers' associations of the city.

The International Acheson Graphite Company, of Niagara Falls, N. Y., has commenced an action in the United States Circuit Court for the Western District of New York against the Castner Electrolytic Alkali Company, also of Niagara Falls, alleging infringement of patents granted to Dr. Edward G. Acheson covering its methods of making graphitized electrodes.

Bulletin 385 of the United States Geological Survey gives a detailed account of the manufacture of briquettes at the survey's Norfolk, Va., fuel testing plant in 1907 and 1908. The report includes notes on the binders used, an illustrated description of the equipment and details of the physical properties and chemical composition of the briquettes made from 16 different coals.

Asbestos Mining Consolidation.

The financial details of the amalgamation of the asbestos properties in Thatford and Black Lake, in the province of Quebec, Canada, have been consummated and organization has been effected by the election of E. B. Greenshields, director of the Bank of Montreal and the Grand Trunk Pacific Railroad, as president; H. E. Mitchell of Cramp, Mitchell & Schober, Philadelphia, as vice-president, and R. H. Martin, president of the King's Asbestos Mines, as general manager. The consolidation includes the following mining properties: King's Asbestos Mines and Beaver Asbestos Company of Thatford, the British Canadian Asbestos Company, the Standard Asbestos Company and the Dominion Asbestos Company at Black Lake. The companies in the Amalgamated Asbestos Corporation, as the consolidation is known, are mining 4000 tons of ore a day, and their holdings include about 70 per cent. of the asbestos properties of the world, and of the 90 per cent. of the world's supply which is obtained in Quebec the Amalgamated Asbestos Corporation controls about 80 per cent. In addition to its holdings the company has a contract for all of the product of the Bell Asbestos Company beyond the manufacturing requirements of companies dependent on the latter. The cash involved in the transaction was \$7,500,000. The capitalization consists of \$7,500,000 of first mortgage 30-year 5 per cent. bonds, \$1,875,000 of cumulative preferred stock and \$8,125,000 of common stock. Of the cash furnished by the underwriters \$3,000,000 was provided in Canada, \$2,000,000 in London and \$2,500,000 in the United States.

The directors of the new corporation, besides the officers mentioned above, are: Hon. Robert Mackay, director of the Canadian Pacific Railway and Bank of Montreal; Hugh A. Allan, director of the Allan Steamship Line and Grand Trunk Pacific; Thomas McDougall, chairman of the Quebec Bank; William McMaster, managing director of Montreal Rolling Mills and Dominion Iron & Steel Company; R. T. Hopper, president of the Standard Asbestos Company; James M. Beck of New York; Dr. R. V. Mattison, president of the Bell Asbestos Mines, Ambler, Pa.; Henry H. Melville, director of the Shawinigan Water & Power Company, and H. Malcolm Hubbard of London, director of the Mexican Tramway Company. The main offices of the company will be located in Montreal.

A New Steel Wheel Plant at West Homestead.—Reports that the Schoen steel wheel plant of the Carnegie Steel Company at McKees Rocks, Pittsburgh, would be removed to Homestead, and operated in connection with the Homestead Steel Works, are officially denied. The Schoen plant will remain at McKees Rocks, but for a year or more the Carnegie Steel Company has carried on experiments at the Homestead Steel Works, under the direction of E. E. Slick, chief mechanical engineer, on a new process for making steel car wheels which has proved quite successful. It is the intention of the company to establish a steel car wheel plant at West Homestead, and it will be located in buildings already erected. The necessary equipment will be installed and the car wheel plant at Homestead, at which steel wheels will be made under the Slick process, is expected to be in operation late in the year with a capacity of about 500 wheels per day.

The formation of a State society of engineers and the preparation of a code to be presented to the Legislature for enactment into law will result from the convention of engineers, held in Harrisburg, Pa., June 8 to 10. The code will be prepared by a committee representing the Engineers' Society of Philadelphia, the Engineers' Club of Scranton, the Engineers' Society of Western Pennsylvania and the Engineers' Society of Pennsylvania, which has its headquarters in Harrisburg. The convention effected an organization which is to last until the new society is formed. Prof. John Price Jackson of the Pennsylvania State College was elected chairman; Major D. F. A. Wheelock, Warren, vice-chairman, and Edward R. Dasher, Central Iron & Steel Company, Harrisburg, secretary.

To Manufacture Charcoal Iron for Wire.

The Spencer Wire Company, Worcester, Mass., has equipped a model plant for the manufacture of charcoal iron blooms for wire products, one of its new buildings being given up to the purpose. The company for years has been a large consumer of charcoal iron for special wires, and as the old source of supply ceased to exist was forced to equip itself to furnish its raw material. Charcoal wire is employed where ease of turning or cutting or threading is required and for other special purposes. The new building is 100 x 150 ft., one story, with two large monitors. Two furnaces have already been started, capable of producing 14 lumps each for a single turn, each lump weighing 250 lb. These are cut in two and are first hammered into blooms about 16 in. long by 7 in. square. They then go to a reheating furnace built after the company's own designs. A superimposed Stewart boiler utilizes the waste heat of the furnace, supplying more than sufficient steam for the hammer and other purposes. After leaving the reheating furnace the blooms are rehammered into finished blooms 36 in. long by 3¼ in. square, each weighing about 125 lb. The necessary blast is provided by a large Sturtevant blower, electrically driven, and the steam hammer is of the Niles-Bement-Pond type. The whole plant is compact and convenient. It was started up without a hitch.

Wages of Iron and Steel Workers Raised.

Announcements have been made by a number of iron and steel companies in the past week of advances in wages, which in most cases are the restoration of the 10 per cent. which was taken from wages in March and April. The Jones & Laughlin Steel Company, Pittsburgh, notified its employees that their wages were computed at the old rate beginning June 1. The Sharon Steel Hoop Company, Sharon, Pa., will advance wages July 1 to the basis prevailing before the reduction of April 1. The Harrisburg Pipe & Pipe Bending Works, Harrisburg, Pa., announced an increase of 10 per cent., effective July 1. Similar advances were made by the Warwick Iron & Steel Company, Pottstown, Pa., to blast furnace workers; by the Glasgow Iron Company and the George B. Lessig Company, Inc., Pottstown, to rolling mill workers; also by Stanley G. Flagg & Co., to employees in its malleable foundry. The Thomas Iron Company, Easton, Pa., has advanced the wages of workers at its blast furnaces and iron mines 10 per cent., effective July 1, and notices were posted this week by the Empire Steel & Iron Company, Catasauqua, Pa., of a 10 per cent. increase at its blast furnaces at Catasauqua, Topton and Macungie, and its iron mines at Oxford and Mt. Hope, N. J.

Two New Steel Corporation Vessels.—The Pittsburgh Steamship Company has closed a contract with the American Shipbuilding Company for two 600-ft. lake boats for delivery early next spring. Both will be built at Lorain, Ohio.

Duluth reports considerable industrial activity ahead: The Northern Dredge & Dock Company, Superior Dredge & Dock Company and the Great Lakes Dredge & Dock Company contemplate extensions to their present facilities at Duluth, Minn.; the Imperial Steel Company, recently organized, is laying a new railroad from Duluth to the Cuyuna Iron Range; the Oliver Iron Mining Company, Duluth, is making extensive improvements at its mines and the Virginia Electric Power & Water Company, a reorganization of the Virginia Light & Water Company, Virginia, Minn., is to issue bonds for enlarging its electrical equipment, the intention being to serve various properties on the Mesaba Range.

The American Railway Association statistics show that the surplus of freight cars in the United States and Canada June 9 was 277,559, an increase of 3669 upon the number reported May 26. The surplus box cars increased 5661 and the gondolas 2400, but these increases were partly offset by the reduction in the number of idle flat and miscellaneous cars.

The Machinery Trade.

NEW YORK, June 23, 1909.

Business thus far this month has been somewhat discouraging to machinery houses, who had anticipated a marked expansion of the betterment which took place in May. From the level of that month there has been but a slight change, which has caused a little uneasiness. For a long time almost the entire business has consisted of small lots of tools, and that condition continues. This class of trade has undoubtedly expanded, and there are more inquiries before the trade now than early in the year, but considerable more activity will have to be infused and more important requirements will have to be closed before a substantial betterment shall take place. The continued holding up of some extensive lists of tools that have been talked about in the trade for months is irritating. It is now said that it is likely that the convention this week of the master mechanics will have a favorable effect, and that they may be issued shortly after July 1. The many machinery men at the convention will have an opportunity to talk with the representatives of the railroads, and the exhibition of tools will probably bring out some orders. The past week the railroads came into the market for a few tools, and these with the industrial requirements of like character constituted a fair business. There does not seem to be nearly the activity in trade in this section of the country as that reported in the West, where the machinery list of the Pullman Company has been issued. In regard to European trade, a representative tool builder, who recently returned from abroad, says that business is not as good there as it is in this country.

The Jones & Laughlin Steel Company, Pittsburgh, Pa., has been doing some extensive buying in this territory for its plant now in course of construction at Aliquippa, Pa.

The Phillips Sheet & Tin Plate Company, Clarksburg, W. Va., has been placing orders for machinery equipment in this vicinity for a large tin plate mill, which it is to establish on the Ohio River, 4 miles above Steubenville. The company is arranging for an extensive plant at that point, and will establish with it a town to be known as Weir, named after the president of the company.

H. C. Hequembourg, general purchasing agent of the American Locomotive Company, New York, has sent out plans and specifications, and contracts will be awarded within the next 10 days for a tank shop and tank paint house to be erected in connection with the Brooks plant at Dunkirk, N. Y. The building is to be of steel frame, brick and concrete construction, 185 x 823 ft. The plans show a layout for future installation of one 40-ton traveling crane, two 20-ton traveling cranes, eight 10-ton traveling cranes and three 5-ton traveling cranes. Invitations will soon be sent out covering a large list of machinery for the tank shop and a machine shop, 185 x 600 ft., on which construction was started three weeks ago.

The American District Steam Company, Lockport, N. Y., received bids last week and will award contracts in a few days for a two-story machine shop, 250 x 250 ft., which it is to erect in connection with the new plant recently completed at North Tonawanda, N. Y. Bids were received last year covering the construction of the new plant complete, including a proposed machine shop somewhat smaller than the present contemplated building, but for some reason contracts were awarded on all buildings except the machine shop, which at present is being maintained in a section of the old plant at Lockport. On completion of the new machine shop the entire plant will be moved to Lockport.

The Goldschmidt Chemical Company, 60 Wall street, New York, is having constructed at Syracuse, N. Y., a large detinning plant, and orders are now being placed for the necessary machinery equipment. The plant will consist of a main building, 60 x 130 ft., another structure, 46 x 139 ft., and a building to take the place of a structure now being razed. The order for the power equipment has been placed with the Westinghouse Companies, and it will consist of a 200-kw. Westinghouse generator, a 300-hp. engine and three 150-hp. boilers with the necessary accessories. The company will also install three 10-ton Northern Engineering Company cranes and considerable special machinery built after its own designs. Later on, it is stated, further extensions will be made, and perhaps some additions will be made to the plant next spring. Dr. F. H. Hirschland, general manager, has charge of the designing and buying details.

The Southern Spring Bed Company, Atlanta, Ga., is to install a new plant at Memphis, Tenn., which will be operated under the name of the United States Bedding Company, a charter for which has been applied for. Jacob R. Haas will be president of the new company, and will have

active management of the business in Memphis. The requirements for the new plant will be principally for special machines, but in addition a drill press, punch press, boring machine and saw table will be purchased.

The Globe Malleable Iron Company, Syracuse, N. Y., is now ready to place additional orders for motors and blowers for its plant, where important improvements are being made. In the spring construction work was started on an annealing and shipping room, two stories, 100 x 126 ft.; a building for additional molding space, 100 x 126 ft., and a wing, 26 x 180 ft., which will be used for additional core room space and experimental purposes. Orders for considerable equipment were placed a short time ago.

The Polson Iron Works, Ltd., Toronto, Canada, steel shipbuilder, engineer and boiler maker, is to expand its business, and will undoubtedly come into the market later for considerable new mechanical equipment. The company has applied for a lease of 50 acres of land at Toronto, at the eastern end of the bay, near Keating's Cut, where it will establish a general shipbuilding plant on a large scale, in connection with which will be a floating dry dock capable of taking the largest of lake vessels. No details are available as yet, as the plans have not been sufficiently advanced.

The A. Lythe & Sons Company, 43 West Eagle street, Buffalo, N. Y., will soon send out invitations for bids on the following equipment to be installed in the new plant it proposes to erect for the manufacture of fireproofing terra cotta blocks and various clay products: Firebrick for six 30 ft. kilns and 12 tunnel dryers, three 200 hp. horizontal tubular boilers, one Corliss engine, pumps, power machinery for pressing hollow ware clay products, blowers for waste heat system, 150 drying cars, track equipment, switches, turntables, &c.

The Racquette River Paper Company, Potsdam, N. Y., has awarded contract to Hayes & Hodge, Watertown, N. Y., for the construction of a new paper mill, 200 x 400 ft., and the steel work to the American Bridge Company. The power equipment is to consist of a hydro-electric plant of 3200 hp. The water turbines have been ordered from the S. Morgan Smith Company, York, Pa. The generating sets, consisting of two 1000 kw. direct connected alternating units and about 10 miles of overhead transmission line, have not been ordered.

Further plans were submitted to the Public Service Commission last week for the construction of the proposed subways in New York, and it now looks as if actual work will be started on the construction of at least one of the subways before long. The Bradley-Gaffney-Steers Company, New York, has submitted a proposal for the construction of a comprehensive subway system embracing the proposed Broadway-Lexington avenue route, the loop subway which is now approaching completion, the Fourth avenue in Brooklyn, the Broadway-Lafayette avenue route, Brooklyn, and for possible extensions in Brooklyn and the Bronx. It is understood that the Public Service Commission is much pleased with the proposal which is to be brought before the Board of Estimate so as to provide, if possible, for the beginning of construction work in the fall. The proposal is based on plans already accepted by the city and provides for the subways to be built by private capital. In this connection it is of interest to note that work of construction has started on the Cape Cod Canal.

The Hudson & Manhattan Railroad Company, 30 Church street, New York, will, it is understood, begin shortly to purchase equipment for a subway extension from Sixth avenue and Thirty-third street, New York, to the Grand Central Station, to be operated in connection with its tunnel under the Hudson River. It will be remembered that these interests, under the name of the Hudson Companies, were large buyers of tunneling equipment for the tubes under the river, and all of the business was placed in this territory. The way has been cleared for the construction of the subway extension mentioned above, and it is said that a large majority of the property owners along the route have signified that they will give their consent for the extension, and the obtaining of their signatures only awaits the Mayor's approval of the franchise granted by the Public Service Commission. The company has announced that it will have trains running over the extension in the early part of 1911, and this will mean that the construction work will be begun very shortly. P. P. Artaud is purchasing agent for the Hudson & Manhattan Railroad Company, and he will probably have charge of the buying.

Business Changes.

The Hubley Mfg. Company, Lancaster, Pa., manufacturer of plain and machined light gray iron castings, has opened a New York office at 50 Church street, which is under the management of Felix F. Wiener. This branch will take care of the growing trade in Greater New York and vicinity.

The Pratt Engineering & Machine Company, Atlanta, Ga., which early in the year acquired the property and business of the Fulton Foundry & Machine Works, continuing the manufacture of the sugar machinery, fertilizing works and sulphuric acid works machinery, has opened an office in Lonja Del Comercio, No. 509, Havana, Cuba, which will cover the trade in Cuba and Porto Rico. It will be under the

management of W. A. Parsons, who was for some time special agent for the West Indies Oil Company, with headquarters in Havana, and who is well known in business circles of both islands. R. E. S. Geare was recently appointed assistant sales manager with headquarters in New York.

The Bessemer Gas Engine Company, Grove City, Pa., builder of gas engines, gas and air producers, &c., recently opened a branch office at 1101 Bessemer Building, Pittsburgh, Pa., in charge of J. W. Macartney. The company has appointed the Cleveland Power Equipment Company, 1114 Citizens' Building, Cleveland, Ohio, as its agent in that district.

Chicago Machinery Market.

CHICAGO, ILL., June 22, 1909.

The machinery market as a whole is steadily becoming more active. Some lines are not expanding as rapidly as others, but the general volume of business is greater than at any time within two years. Trade in machine tools appears to have slowed up somewhat of late, and reports from the leading houses indicate that unless there is considerable improvement between now and the end of the month business for the present month will fall short of that of May. During May the demand was unusually active, the ordinary run of orders being notably augmented by the purchase of several good sized automobile and farm implement shop equipments. The requirements of these interests are now believed to have been pretty well covered for the present and the recent rate of buying is not likely to be indefinitely sustained. Machine tool orders from miscellaneous sources are not appreciably diminished in number, and there are still in prospect requirements of important size from some of the larger industrial concerns. Equipment for a new structural shop amounting to about \$25,000 is now being figured on by the trade and most of it will probably be purchased soon. Included in the list of tools for which the Pullman Company is now in the market are 210 pneumatic tools which, it is said, will constitute the largest single order of this kind ever placed. The compressor engines included in this installation will cost around \$50,000 to \$60,000. Only a few scattered orders for machine tools are coming from the railroads, and these are usually limited to single tools. No branch of the machinery trade is making better progress than the electrical lines. The inquiries for central station power equipment are more numerous, and include quite a number of new installations calling for large units in generators and dynamos. Generally speaking, there is little room for complaint concerning either the present or prospective development of business.

Pullman Company's Machinery Requirements.

The following list of machine tools for equipping its new car shops at Pullman, Ill., has been issued by the Pullman Company: Two double angle shears on turntables, capacity 6 x 6 x 1 in. angles, motor driven; two gate shears, 30-in. throat, to cut 1-in. steel plates 12 ft. at one stroke, motor driven; one gate shear, 24-in. throat, to cut $\frac{3}{4}$ -in. steel plates 5 ft. at one stroke, motor driven; two single shears, 24-in. throat, to shear $\frac{3}{4}$ -in. plates, motor driven; one double shear, 20-in. throat, to shear steel bars 10 x 2 in., motor driven; two heavy double geared multiple punches to take plates 10 ft. wide between housings and carry gang of 40 punches, capacity 40 holes 13-16 in. in diameter through $\frac{3}{8}$ in. plate, motor driven; two multiple punches with gang of eight punches 13-16 in. in diameter for punching plates up to 30 in. wide by 50 ft. long and $\frac{1}{2}$ in. thick, motor driven; two single punches, 36 in. throat capacity, 4 in. diameter through 1 in., equipped with 1 ton cranes having 10 ft. radius, motor driven; four horizontal punches, 12 in. throat, to punch $\frac{7}{8}$ in. holes through $\frac{3}{4}$ in. thick, with cranes of 500 lbs. capacity and 8 ft. jib, motor driven; one horizontal punch, 15 in. throat, to punch 1 3-16 in. through $1\frac{1}{8}$ in. thick with 1000 lb. cranes and 8 ft. jib, motor driven; one set of angle straightening rolls to straighten 2 x 2 x $\frac{1}{4}$ in. up to 4 x 4 x $\frac{1}{2}$ in., motor driven; one planer, 48 in. x 14 ft., two head power elevation cross rail direct, motor or motor belt drive; one 24 in. x 12 ft. planer, direct motor or motor belt drive; one automatic knife grinding machine for knives 16 in. to 13 ft. long and $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. thick, motor driven; one 18 ft. heavy type motor driven shaper; one 60 in. boring and turning mill with hight under tool not less than 36 in., motor driven; one double bolt cutter, capacity up to $1\frac{1}{4}$ in. bolts, motor driven; one water tool grinder, 20 in. x 2 $\frac{1}{2}$ ft. wheel, belt driven; one 8 in. shop saw belt; one 12 in. engine lathe, 20 in. between centers, belt driven; one sensitive drill, about 13 in. swing, belt driven; three 32 in. back geared vertical drill presses, motor driven; four 4000 cu. ft. Corliss engine compressors; 150 air hammers; 60 air drills; one 15 in. slotting machine, motor driven; one 5 $\frac{1}{2}$ ft. universal radial drill; one 32 in. vertical drill, back geared and motor driven; one 24 in. vertical drill, hand

and power feed, motor driven; two 16 in. engine lathes, 2 ft. 6 in. between centers, motor driven; two 24 in. engine lathes, 8 ft. between centers, motor driven; one No. 3 universal milling machine, with working surface about 53 x 12 in. transverse traverse 10 $\frac{1}{2}$ in. and longitudinal traverse 36 in., motor driven; three punches for shapes and plates, 24 in. throat, capacity eight 1 in. diameter holes through $\frac{3}{4}$ in. thick at one stroke, motor driven; two single punches 50 in. throat, capacity 1 in. holes through 1 in. thick, one punch to be used at a time, motor driven; two single punches, 20 in. throat, capacity $1\frac{1}{4}$ in. through $1\frac{1}{8}$ in., motor driven; two double punches, 25 in. throat, capacity 1 in. diameter through 1 in. thick, motor driven; two single rapid action punches, 16 in. throat, capacity $\frac{3}{4}$ in. diameter through $\frac{1}{2}$ in., 60 strokes per minute, motor driven. In submitting bids copy of motors is to be given.

About a year ago the San Pedro & Los Angeles Railroad had plans prepared for construction of new shops at Los Angeles, Cal., and was about ready to let contracts for their erection and equipment when it was decided to postpone the work indefinitely. It is understood that the project has been revived and that steps are now being taken to carry out the original plans. Entirely new equipment will be required for these shops, which will include machine tools, hydraulic machinery, boilers, engines, &c. N. H. Foster, Los Angeles, is purchasing agent.

The A. D. White Machinery Company, Chicago, has secured the Chicago agency for Shellenbach engine lathes built by John B. Morris Foundry Company, Cincinnati. Several of the three step cone double back gear styles of this tool have been included in the recent sales of this agency. Among the new tools lately received by this house is a 17-in. shaper made by the Averback Shaper Company, Cincinnati, one of the first of this size turned out by the maker.

Plans under consideration by the Baker Mfg. Company, Evansville, Wis., include the erection of an addition to its present plant, 80 x 150 ft., three stories, and a power house, 60 x 80 ft., one story. Equipment to be purchased for this improvement includes engine, generators, boilers, motors, &c.

The Jefferson Power & Improvement Company, Jefferson, Okla., has been organized with a capital stock of \$100,000, to build and equip a hydro-electric plant. It is stated that the company will be ready to purchase material and machinery equipment for the installation of this plant in about 90 days. The proposed plant is designed to develop 1500 hp., and the use of a 500 hp. gas producer plant for auxiliary power is under consideration.

The Pike County Water Power Company, Little Rock, Ark., capitalized at \$1,000,000, expects to commence construction work in the near future upon a hydro-electric plant on the Little Missouri River near Murfreesboro, for the generation of electric current to be distributed to all important towns within a radius of 100 miles or more. Specifications for machinery and equipment have not been completed for this installation, but investigations are being made by the company touching its requirements through its secretary. The company is officered as follows: Claudius Jones, president; George A. Showers, vice-president; B. C. Bain, secretary, and E. W. Holmes, treasurer.

The Ainsworth Electric Light & Power Company, Ainsworth, Neb., organized and incorporated with a capital stock of \$60,000, is arranging to install a water power electric light plant on Plumb Creek, about 14 miles northwest of Ainsworth. Plans for this improvement are now in course of preparation by the company's engineer, who will soon be ready to receive bids for the construction of the dam. The company will be in the market for electrical machinery and water wheel about July 1, and it is hoped that the plant will be ready for operation early this winter.

The Cribben & Sexton Company, Chicago, whose present stove plant is located on Erie street between St. Clair and Orleans streets, has secured 8 acres of land on the Chicago, Milwaukee & St. Paul Railroad tracks, on Ohio street and Albany avenue, for the erection of a new plant. It is expected that it will be constructed and ready for occupancy some time within a year. About \$300,000 will be expended for buildings and equipment.

Cincinnati Machinery Market.

CINCINNATI, OHIO, June 22, 1909.

While the sales records of manufacturers and dealers show in the aggregate but a slight percentage of gain in the tool line, there is enough assurance apparently in correspondence and through dealers to warrant the issuance of orders for skilled help, the increase of time in almost every department, and the collection of all forms of castings and assembling of parts. This is the most noticeable feature of the machine tool trade in this section. Quite naturally the tone is optimistic. Word from Atlantic City indicates that there is intense interest manifested on the part of the master mechanics and car builders in every piece of improved tool machinery, and it is felt that some recommendations

will be made to the large corporations in the interval between now and July 1, which starts another fiscal year for most railroads and other large institutions—recommendations that will eventually redound to the credit of the sales department.

Heavier tools are still dragging a bit, the planers being probably the most sluggish, although some improved types which are being shown have excellent prospects, judging from the tone of correspondence and inquiries. Milling machines continue to lead in popularity, and where a month or six weeks ago the automobile manufacturers represented fully 50 per cent. of the buying, to-day it is stated that general trade has so much improved that 25 per cent. would represent the automobile purchasing, although the volume of automobile trade is not appreciably less. Drills are promising, and some very good sales of lathes have been made for shipment West.

Dealers as a rule are optimistic. The larger interests report a better class of tools in demand and some lists of quite respectable size for installation in shops where cars and conveying equipment are built and repaired.

Foundries are increasing their melts slowly; the largest interest in this field, which is equipped with the latest and most expensive devices known to the trade, reports five heats per week of gradually increasing size. All local foundries are looking forward to a steadily improving last half, and some are replenishing pig iron stocks, although the greater number of them are rather heavily stocked or have iron coming from furnaces on contracts placed in the fall of 1908.

Additional ground has been secured in Alliance, Ohio, for the enlargement of the plant of the McCaskey Register Company. The Board of Trade purchased two lots adjoining the plant and deeded them to the company. The board also secured an option on the Bauch foundry adjoining, which is intended ultimately to form a part of the McCaskey plant.

Statistics secured in Richmond, Ind., by interested parties convinced them that a foundry for the manufacture of gray iron castings would be a profitable investment and in consequence the movement has been inaugurated to form the Richmond Foundry Company in that city. The capital stock will most likely be \$75,000. The working capacity of the plant is expected to be about 30 tons per day. Although the original intention is to make only gray iron castings, it is thought probable that malleable castings may be taken up later.

Word from Jeffersonville, Ind., indicates that the big car works plant at that point is to be a busy place for some time. Charles Dean, inspector in the service of the Rock Island Railroad, is there superintending the construction of about 130 steel passenger cars, 90 of which are for the Rock Island, the remainder for the Frisco line.

The standard of 1906 has about been reached in the plant of the Ralston Steel Car Company at Columbus, Ohio, according to word from that city. All departments are reported in operation, being engaged mostly on a lot of small orders. The steel mine car, which is one of the company's specialties, is in steady demand.

A. C. Chamberlain and J. A. Weiner of Toledo, Ohio, have formed a partnership for the conduct of a foundry business under the firm name of the Enterprise Foundry Company, which will be located at 721 Bancroft street. The company will manufacture work in red and yellow brasses, phosphor bronze and dry pattern products.

Milwaukee Machinery Market.

MILWAUKEE, WIS., June 22, 1909.

The business situation has practically ceased to be a topic of conversation in this locality. Instead of speculating upon the possibilities of future trade manufacturers are now engaged in preparing to grapple with them, and in the majority of the metal working plants there is every indication of a continuously busy season ahead. Some producers of machinery even go so far as to state confidently that, in their judgment, the close of the current year will be so strong as to make the 12 months show an aggregate of sales equal to any similar period in their history. Among such the Allis-Chalmers Company is prominent. For some weeks past this company has been turning out, on an average, one steam turbine and one reciprocating steam engine per day, with in most cases an electric generator designed for operation with it and much auxiliary apparatus. Other types of prime movers, as indicated by last month's reports, are also in demand. Engine driven refrigerating plants, inclusive of the type used for drying the blast at iron furnaces, are being worked upon in considerable number by the Vilter Mfg. Company; there is activity in engines and heavy sawmill machinery at the works of the Filer & Stowell Company, and hoisting engines, air compressors, blowing engines, &c., are beginning to fill the erecting floor

of the Nordberg Mfg. Company. With conditions approaching normal at the plants of these and other leading manufacturers recently referred to, the local market for shop and foundry equipment, iron and steel castings, brass, copper, nickel and aluminum parts, spelter, compositions and alloys, pig iron, scrap, sheet metal, forgings, stampings, perforated plates, pressed steel shapes, angles, bars, rods, bolts washers, rivets, nuts, gears, chains, friction clutches, valves, abrasives, graphite, lubricants and a great variety of materials used either in the building or assembling of machinery is becoming quite brisk. A visit this week to some of the larger plants showed correspondence piled high upon the desks of purchasing officials and an apparent increase in their clerical force—usually a good barometer of present or impending activity.

Machine tool builders are finding business quite satisfactory, both for standard and special tools. A development of interest in relation to the latter is the fact that a number of Northwestern manufacturers, in planning improvements to their works, are reported to have decided upon having considerable shop machinery built after their own designs. The tendency is toward larger, heavier, more rigid apparatus, with higher speeds and quicker return of forward moving parts. To effect the last named for large traveling beds the use of compressed air is receiving considerable attention.

Improved methods of welding and cutting, both by the electric and oxy-acetylene processes, are also being investigated more than they ever have been before in this section of the country, and orders for considerable apparatus of this character will be placed by Northwestern metal workers and founders within the coming year. The oxy-hydric process, imported from Belgium, a plant for which is now being built in Milwaukee, gives promise of being largely introduced, but at present it is very little known.

The Milwaukee Electric Railway & Light Co. has begun preparations for the foundation work of its new construction and repair shops. Announcement is made that these will provide for building complete cars of the semi-steel type, and an extensive line of motor driven machine tools, hydraulic machinery, cranes, hoists, &c., will be required. Contracts for equipment will probably not be placed, however, for some time yet.

Construction of the Grand Rapids & Nekoosa Interurban Railroad, beginning at Grand Rapids, Wis., will be undertaken by the Knox Engineering Company, Chicago, and work is to start this month. The power equipment is not understood to have been as yet decided upon.

It is reported that a Corliss engine of 500 hp. will be required for the Kurtz-Downey Company's new factory at Roy's Point, near Bayfield, Wis.

The Milwaukee Locomotive Mfg. Company has under construction a very compact type of gasoline engine driven locomotive for railroad or industrial service. It is particularly adapted for switching or other use in yards.

The McDonald Mfg. Company, Des Moines, Iowa, will manufacture boilers, tanks and other riveted sheet metal work.

The Northern Idaho & Montana Power Company, Sandpoint, Idaho, has merged the power plant systems in the vicinity of Kalispell, Mont., and will undertake extensive betterments, leading to the ultimate purchase of additional water turbines and generators, with possibly an auxiliary steam or gas engine driven plant.

The Kenosha Electric Railway Company, Kenosha, Wis., has completed plans for its new power house. A steam turbine and generator of 400 hp., with boilers, heaters, pumps, &c., will be installed.

Milwaukee builders have been given contracts for the power equipment for four rock breaking plants to be erected by the State of Washington. The crushers will be furnished by the Austin Mfg. Company, Chicago.

The hydro-electric plant of the White River Power Company has passed under the control of the Ashland (Wis.) Light, Power & Street Railway Company and additions to the latter's present system will be made this year.

A machine shop, 125 x 300 ft., and blacksmith shop, 60 x 140 ft., are to be erected this summer for the Davenport Locomotive Works, Davenport, Iowa. Construction will be of brick, with steel reinforcement. The usual equipment of forging, metal working, power, hydraulic and pneumatic machinery will be installed.

In the States bordering on the North Pacific Coast and those immediately adjoining construction work is very active. Projects recently undertaken include a group of mills and shops to be built for the Puget Sound Iron & Steel Works, Tacoma, Wash.; new central power station for the Federal Navy Yard at Bremerton Haven, Wash.; formation of the Big Bend Light & Power Company, Spokane, and Puget Sound Power Company, Seattle, Wash.; chartering of the Washington Traction Company to build a system of electric railways radiating from Walla Walla and of the Eugene-Pacific Western Railroad to construct a traction line from Eugene, Ore., to Florence. Others have already been reported in *The Iron Age*. With the exception of the first two mentioned, machinery requirements have not yet been deter-

mined upon, but can be ascertained in due course at the addresses given.

Cleveland Machinery Market.

CLEVELAND, OHIO, June 22, 1909.

The market shows some improvement both in the volume of orders and inquiries, dealers generally reporting a fair volume of business the past week. The demand is largely for drills, lathes, gear cutters, milling machines and grinders. While no good sized inquiries are coming in, the proportion of orders for single tools is smaller than a few weeks ago, single inquiries for three or four tools being more plentiful. A large portion of the business is coming from medium sized manufacturing plants that are increasing their capacity by the addition of a few new tools or the substitution of new for old ones. The demand for machine tools continues good from various manufacturers of automobile parts, whose plants are still crowded with work. A large share of these manufacturers expect to increase their capacity for the coming season. Automobile builders, also, continue to buy quite freely, the majority of the larger plants from time to time adding a few new tools. Few new industrial projects in metal working lines are being launched, so that there is not much demand for machine tools from that source. In electrical machinery builders of small motors and generators report considerable improvement in orders, but the demand for large electrical equipment is less active than a few weeks ago. Some fairly good inquiries are pending, however, which are expected to result in an improvement in the volume of orders after July 1. Dealers in small engines and pumps report a steady increase in orders. The demand for small cranes for shop purposes continues fairly good. There is a good demand for second-hand tools and the supply of good used tools is rather limited.

In the foundry trade the demand for steel castings, which has remained light the past few months, shows an improvement. Foundries have more small orders for quick delivery, but as yet do not have much work ahead. The demand for light gray iron castings continues fairly good.

The Rauch & Lang Carriage Company, Cleveland, manufacturer of electric automobiles, is having plans prepared for the erection of additions to its plant, which will double the present capacity. The company will build a machine shop, two stories, 64 x 112 ft., and two four-story buildings for manufacturing purposes, of about the same dimensions. It has not placed orders for its additional machine tool equipment, but expects to be in the market soon. Considerable machinery will probably be bought.

The Niles Forge & Mfg. Company, which has commenced the erection of a new plant in Niles, Ohio, has been incorporated with a capitalization of \$20,000. The company has effected an organization by the election of the following officers: President, H. J. Robbins; vice-president, B. J. Rosensteel; secretary and treasurer, J. N. Baldwin. The Board of Directors is composed of H. J. Robbins, George B. Robbins, O. E. Hewitt, J. S. Rosensteel and B. J. Rosensteel. The company expects to have its plant in operation about September 1 and will make a specialty of heavy forgings.

The Board of Trade of Niles, Ohio, has signed a contract with the Stanley Works of New Britain, Conn., for the erection of a new plant in Niles. A site of 17 acres has been secured and it is expected that the erection of a large plant will be commenced at once.

The Motch & Merryweather Machinery Company, dealer in machine tools, will open an office in Pittsburgh July 1. The company will be located in the Farmers' Bank Building, and the office will be in charge of James H. Herron, recently chief engineer of the Detroit Steel Products Company and formerly connected with the engineering department of the Cambria Steel Company.

The Cleveland office of the Allis-Chalmers Company has received an order from Corrigan, McKinney & Co., for equipment for the latter company's new blast furnace in Cleveland, including a 66-in. type B condenser head, motor driven centrifugal pump, 10 x 25 x 20 in. vacuum pump and a structural steel supporting tower.

The Cleveland office of the Waterbury Farrel Foundry & Machine Company has this month received some good orders for forge machinery for plant extensions, and also reports a number of sales of bolt machines and rolling mill machinery.

A new electric welding machine, the invention of W. C. Winfield, president of the Winfield Mfg. Company, Warren, Ohio, is being placed on the market.

The Turbine Motor Electric Car Company, Cleveland, has been incorporated with a capitalization of \$50,000, by A. G. Mason and others. For the present the company will not engage in manufacturing.

New steam and electrical machinery will be installed in the Girls' Industrial Home, Rathbone, Ohio, for which bids will be received by the Board of Trustees July 16.

New England Machinery Market.

BOSTON, MASS., June 22, 1909.

The machine tool industry continues to improve, judging from reports received from a large number of the manufacturers. Among the dealers the week has been no better than others that have preceded it, and perhaps not quite so good as some recent periods. The machinery builders are very much encouraged by recent orders and inquiries, practically all lines, with the exception of planers and some other of the heavier tools, being in more active demand. Milling machines still lead in the market, deliveries being by no means prompt in many cases, and every sign pointing to a growing change for the worse in this direction. Manufacturing generally is on the increase. The usual occasional exception is found, where the report is that business is not so good as it was earlier in the year, but nevertheless it is a fact that the improvement which is evident in other sections of the country is reflected strongly in New England. Labor is getting scarcer; the number of men of all classes who are out of work is constantly becoming smaller. Available skilled men are really very rare. Some new machines have been bought lately by the large shipyards, which would seem to indicate the expectation of a good season. The Bath Iron Works, Bath, Maine, has the contract for one of the new torpedo boat destroyers, and there is strong hope that the contract for one of the new battleships will come to New England. The navy yards are very busy preparing ships for the summer practice cruise. It is a commentary on the new order of things at the yards that the shops are accomplishing more with present equipment than was the case where several departments operated independent plants. Little new machinery will be required at the Charlestown Navy Yard, one reason being the increased efficiency under a more businesslike management. It is expected that the torpedo factory at Newport will be in the market for some machinery later in the season.

The Connecticut River Transmission Company, which is closely allied with the Connecticut River Power Company, is petitioning the city of Worcester, Mass., for the right to enter the city with its wires and dispose of electric power for manufacturing purposes. The power is generated by the Connecticut River Power Company at the great new plant on the Connecticut River, just south of the Massachusetts line, 50 miles from Worcester. The American Steel & Wire Company has contracted with the company for 1500 hp., with which to operate the Heroult steel furnace which will be located at the Worcester works. Now it is proposed to introduce the power into this important manufacturing center for general consumption and dispose of it at a price considerably below what it can be generated for by steam. The city is 40 miles from tidewater, and there is no water power, and consequently manufacturers are somewhat handicapped by the cost of power as compared with locations better situated. It is understood that the Connecticut River Company will dispose of 8000 hp. in Worcester if the necessary rights can be obtained. The manufacturers of Worcester are keenly and actively interested in the matter.

A dispatch from Pawtucket, R. I., states that negotiations are practically completed for the sale of the works of the Atlantic Rubber Boot & Shoe Company, Auburn, R. I., to the Maxwell-Briscoe Motor Company, Pawtucket, R. I. The plan comprises the abandonment of the Pawtucket plant and the removal of the business to Auburn. The new works would give the company greatly increased manufacturing space.

The Boston & Maine Railroad will make large improvements at Fitchburg, Mass., plans calling for several new bridges, including a 150-ton steel bridge over the Nashua River, a new roundhouse and 70-ft. electric turntable, involving in all the expenditure of \$250,000.

The week's announcements of new general manufacturing construction include the probable building of a large spinning mill at Lowell, Mass., for the United States Worsted Company; \$100,000 woolen mill for the Germania Mills Company, Holyoke, Mass.; dye house, 60 x 110 ft., for the Rock Mfg. Company, Rockville, Conn., this being in addition to new building already announced, and large increases for the Nonquit Spinning Company, New Bedford, Mass., which is to issue \$1,200,000 of new stock, doubling the capital; additions, 24 x 64 ft., two stories, and 35 x 60 ft., four stories, for the N. L. Birge Sons Company, Bristol, Conn., underwear manufacturers; factory, 35 x 70 ft., for the Queen Anne Company, New London, Conn., manufacturer of curtains; addition to factory of Clear Felt Hat Company, South Norwalk, Conn. The Dartmouth Mill Corporation, New Bedford, will spend between \$1,300,000 and \$1,400,000 on additions which will contain 80,000 spindles and the requisite number of looms.

The main building of the fertilizer plant which the Rogers & Hubbard Company, Middletown, Conn., will erect at Portland, Conn., will be 142 x 246 ft., one story.

The Waterbury Battery Company, Waterbury, Conn.,

manufacturer of electric batteries, will erect a large new factory building.

W. H. Leland & Co., Worcester, Mass., manufacturer of grinding machines and other machine tools and automobile crank shafts, are to build an addition to their works, 60 x 60 ft., three stories. Most of the new space will be given over to the machine shop, to take care of the manufacture of grinding machines and other tools which may be added to the line later.

The city of Providence, R. I., is contemplating replacing the plunger pumps at its sewage pumping station with pumps of the centrifugal type.

It is hoped that work on the new industrial school at Worcester, Mass., will begin by fall. The plans call for shops of sufficient size to take care of a large number of boys.

The Regealed Ice Company, Providence, R. I., will erect a large plant for the manufacture of artificial ice on Promenade street.

The new building of the Locomobile Company of America, Bridgeport, Conn., will be 54 x 150 ft. and four stories.

The result of the sale of the plant and equipment of the Portsmouth Forge Company at Portsmouth, N. H., June 15, was most gratifying, the real estate selling for \$17,000, plus unpaid taxes, and the personal property \$26,000, a total of \$43,000. Active bidders were present from Indiana, Missouri, Maryland, Delaware, Pennsylvania, New York and the New England States, and 350 or more lots of machinery were disposed of. The property was sold by J. E. Conant & Co., auctioneers, Lowell, Mass.

Philadelphia Machinery Market.

PHILADELPHIA, Pa., June 22, 1909.

The trade during the week has been giving considerable attention to the conventions of the Master Mechanics' and Master Car Builders' associations at Atlantic City, N. J., several manufacturers in this territory making exhibits of tools and appliances, while a large number of representatives of the trade were in attendance. There seems to be a slackening down in the demand, as far as new business is concerned. Sales have been largely of a single tool character, but aggregate on the whole a fair volume. The few large propositions still before the trade move rather slowly, developments being more rapid when small propositions are under consideration. Notwithstanding the fact that immediate business is less active, the trade views the situation optimistically, and while active conditions are hardly expected to prevail during the summer months, it is believed that a fair volume of business will develop early in the fall. The fact that the railroads are more active buyers of rolling stock is considered encouraging. The increased volume of business coming to the shipyards and the movement of general business is more favorable.

Builders of tools and special machinery in this territory report a small gain in the general run of business, although the forward movement is not as active as it was early last month. In some few cases more mechanics are employed, but the greater proportion of plants have been able to take care of the slightly greater volume of business without increasing working forces. The demand from abroad shows no betterment, but few inquiries come out and the volume of business is consequently small.

The second-hand machinery market has been somewhat irregular, a fair demand for tools of a medium size is to be noted, while that for the heavier types is less active. Second-hand boilers and engines show but a fair movement, although some moderate sized business has been done in new boilers, the most important being that for the power equipment for the new Curtis Publishing Company Building. A fair amount of new engine business is also pending, but develops rather slowly.

A slight betterment is to be noted in the foundry trade. There is a larger demand for castings of a general character as well as for some classes of machinery castings, and both gray iron and steel casting plants are a trifle better employed.

Frank Toomey, machinery merchant, has incorporated his business under the Pennsylvania laws with a capital of \$100,000. Frank Toomey is president and H. F. Curry, secretary and treasurer. The Board of Directors, together with the officers, are as follows: F. L. O'Brien, C. J. O'Brien, H. W. Clatt and J. A. Condon. The business of buying and selling new and second-hand machinery, tools and power equipment will be continued as heretofore.

The Royersford Foundry & Machine Works, Royersford, Pa., notes a material improvement in business over that of several months ago. An increase of about 25 per cent. is reported in the power transmission department, and its entire plant is now operating at three-quarter capacity. Business in the punch and shear department has been rather quiet,

although inquiries recently have improved considerably and the following sales are reported: A No. 3 machine has been shipped the Camden Iron Works, Salem, Va.; No. 1 combined machine was sold the Moffat Machinery Mfg. Company, Charlotte, N. C., while a No. 1 and a No. 3 combined machine were furnished Henry Frank, Jr., New York.

Shipbuilding shows a decided forward movement, and yards in this vicinity have taken quite a fair volume of business. The New York Shipbuilding Company has, we understand, closed contracts for two steel vessels of 6700 tons carrying capacity for the Coastwise Transportation Company, while the William Cramp Ship & Engine Building Company was the low bidder for furnishing four second-class harbor boats for the Government.

The Landis Tool Company, Waynesboro, Pa., is running its plant at full capacity. A considerable increase in business is noted.

Ballenger & Perrot, engineers, have awarded a contract to B. P. Evans & Co. for the erection of an ice manufacturing plant at Glenwood and Montgomery avenues for the American Ice Mfg. Company. The plant consists of a freezing building, 60 x 170 ft., and ice storage building, 60 x 120 ft.; distributing building, 43 x 69 ft., and a power house, 51 x 130 ft. This is the first one of three plants which the company proposes to erect in this city.

Government Purchases.

WASHINGTON, D. C., June 22, 1909.

The Isthmian Canal Commission will shortly ask bids for two pipe cutting and threading machines and other supplies.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until July 10 for generating equipment and fans for the Naval Hospital at Curacao, P. I.

The Isthmian Canal Commission will receive bids until June 30, Circular No. 519A, for submarine boilers.

The Isthmian Canal Commission will receive bids until July 12, Circular No. 519, for air drills, hydraulic punch, post drills, pipe cutters, rail benders, &c.

The following bids were opened June 14, Circular No. 512, for machinery for the Isthmian Canal Commission:

Class 1.—One centrifugal pump and engine—Bidder 12, Bucyrus Company, Milwaukee, Wis., \$12,100; 22, Ellicott Machine Company, Baltimore, Md., \$13,950; 46, Manning, Maxwell & Moore, New York, \$11,500; 85, Vermilye & Power, New York, \$12,275.

Class 4.—One 15-hp. gasoline motor—Bidder 4, Automatic Machine Company, Bridgeport, Conn., \$825; 24, Fairbanks Company, New York, \$660; 48, Model Gas Engine Works, New York, \$705; 51, Motley, Green & Co., New York, \$699, \$710 and \$745; 72, Standard Motor Construction Company, Jersey City, N. J., \$838; 77, Tasker & Strawbridge, Philadelphia, Pa., \$605.50; 78, Termaat & Monahan Company, New York, \$393 and \$341.

Class 5.—One 10-hp. gasoline motor—Bidder 4, Automatic Machine Company, Bridgeport, Conn., \$725; 20, Drew Machinery Agency, Manchester, N. H., \$1124 or \$2200 for classes 4 and 5 combined; 24, Fairbanks Company, New York, \$380; 51, Motley, Green & Co., New York, \$510, \$553, \$615; 72, Standard Motor Construction Company, Jersey City, N. J., \$710; 77, Tasker & Strawbridge, Philadelphia, Pa., \$520.50; 78, Termaat & Monahan Company, New York, \$268.

Class 9.—One motor driven trolley—Bidder 10, Alfred Box & Co., Philadelphia, Pa., \$175; 14, Case Mfg. Company, Columbus, Ohio, \$575 for classes 9 and 10 combined; 54, Niles-Bement-Pond Company, New York, \$575 for classes 9 and 10 combined; 71, Sprague Electric Company, New York, \$362; 93, Yale & Towne Mfg. Company, New York, \$348; 97, Cleveland Crane & Engineering Company, Wickliffe, Ohio, \$495 for classes 9 and 10 combined.

Class 10.—One electric hoist—Bidder 10, Alfred Box & Co., Philadelphia, Pa., \$300 and \$350; 14, Case Mfg. Company, Columbus, Ohio, \$575 for classes 9 and 10 combined; 54, Niles-Bement-Pond Company, New York, \$575 for classes 9 and 10 combined; 68, Schuchardt & Schutte, New York, \$375; 71, Sprague Electric Company, New York, \$628; 93, Yale & Towne Mfg. Company, New York, \$335; 97, Cleveland Crane & Engineering Company, Wickliffe, Ohio, \$495 for classes 9 and 10 combined.

Class 11.—One horizontal boring and drilling machine—Bidder 27, Fox Brothers & Co., New York, \$2988; 46, Manning, Maxwell & Moore, New York, \$3225; 51, Motley, Green & Co., New York, \$2714.60; 54, Niles-Bement-Pond Company, New York, \$3490 and \$2220; 61, Prentiss Tool & Supply Company, New York, \$3768.

Class 12.—One vertical hollow chisel mortising and boring machine—Bidder 7, Bentel & Margedant Company, Hamilton, Ohio, \$1555; 25, J. A. Fay & Egan Company, Cincinnati, Ohio, \$2225 and \$2525; 33, Greenlee Brothers & Co., Chicago, Ill., \$2518; 46, Manning, Maxwell & Moore, New York, \$2938; 92, S. A. Woods Machine Company, Boston, Mass., \$1716.

Class 13.—One rotary splitting shear—Bidder 17, Covington Machine Company, Covington, Va., \$1950; 46, Manning, Maxwell & Moore, New York, \$1325 and \$1895.

Class 14.—One belt driven horizontal punch—Bidder 17, Covington Machine Company, Covington, Va., \$985; 20, Drew Machinery Agency, Manchester, N. H., \$1040; 27, Fox Brothers & Co., New York, \$1114.67; 46, Manning, Maxwell & Moore, New York, \$949; 52, Murray & Tregurtha Company, South Boston, Mass., \$1225 and \$1080; 54, Niles-Bement-Pond Company, New York, \$1040; 58, Henry Pels & Co., New York, \$750; 62, Queen City Punch & Shear Company, Cincinnati, Ohio, \$925; 94, Buffalo Forge Company, Buffalo, N. Y., \$810.

Class 15.—One portable pneumatic riveter—Bidder 1, Chester B. Albree Iron Works Company, Allegheny, Pa., \$719, \$794 and \$620; 16, Chicago Pneumatic Tool Company, Chicago, Ill., \$495; 52, Murray & Tregurtha Company, South Boston, Mass., \$1445 and \$900; 88, Watson & Co., Philadelphia, Pa., \$488.50.

Class 16.—Four hand bolt cutters—Bidder 5, Baltimore Hub Wheel & Mfg. Company, Baltimore, Md., \$186; 20, Drew Ma-

chinery Agency, Manchester, N. H., \$150 and \$160; 30, R. W. Geldart, New York, \$147.96; 45, Manhattan Supply Company, New York, \$157.60; 46, Manning, Maxwell & Moore, New York, \$144; 50, Montgomery & Co., New York, \$141.60; 51, Tucker Tool & Machine Company, New York, \$154.40.

The following bids were opened June 15 for machinery for the navy yards:

Class 1.—Engine lathe, crank shaper, drill press, &c.—Bidder 45, Fairbanks Company, New York, \$1722.85; 55, Hendrie & Bolthoff Mfg. & Supply Company, Denver, Colo., \$1379; 61, Hendey Machine Company, Torrington, Conn., \$1319, part; 78, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, item 1, \$689.50 and \$709.50; 80, Manning, Maxwell & Moore, New York, \$1299; 81, John B. Morris Foundry Company, Cincinnati, Ohio, item 1, \$485; 82, Mine & Smelter Supply Company, Denver, Colo., items 2 and 3, \$735; 92, Niles-Bement-Pond Company, New York, \$1260, part; 99, Prentiss Tool & Supply Company, New York, items 1 and 2, \$1082.

Class 11.—One universal disk grinder—Bidder 10, Charles H. Besley & Co., Chicago, Ill., \$896.75; 42, Frevert Machinery Company, New York, \$908; 62, Hallidie Machinery Company, Seattle, Wash., \$819.

Class 12.—Two two-spindle centering machines—Bidder 62, Hallidie Machinery Company, Seattle, Wash., \$240.

The following awards have been made for machinery for the navy yards, bids for which were opened April 27:

Niles-Bement-Pond Company, New York, class 71, one universal grinding machine, \$848.

William Sellers & Co., Philadelphia, Pa., class 72, one universal grinding machine, \$210.

Under bids opened May 18, for machinery for the navy yards, the Whiting Foundry Equipment Company, Harvey, Ill., has been awarded class 11, one hoisting crane, \$2040.

Under bids opened May 24, Circular No. 508, for machinery for the Isthmian Canal Commission, Motley, Green & Co., New York, have been awarded class 3, 13 pneumatic geared air hoists, \$1686.

Under bids opened June 1, for machinery for the navy yards, the D'Olier Engineering Company, Philadelphia, Pa., has been awarded class 2, one locomotive type boiler, \$2020.

An Epoch in Good Road Construction.

BY COKER F. CLARKSON.*

There is under way a movement going to the foundation of things in the good roads matter. To many, good roads are an uninteresting and hackneyed subject. But of their vital necessity and of the advisability of constantly urging their construction there should be no debate. No other improvement will pay to the people such dividends as modern highways. A nation's reputation for enterprise, progress and all that goes to make it worth living in is determined very largely by the character of its roads, the great arteries through which flow the business and pleasure of the nation.

The public road is a principal feeder of our civilization. We take pride in our crops and products, often forgetting public roads must bear them to market. We lead the world in railroad building, but for every mile of railroad we have 10 miles of highway, such as it is. Perhaps this in a way indicates the relative importance of improved highways.

The benefits to be derived from a reasonably good common road system would be shared by all classes—the farmer reaping a better profit through easier transportation to commercial centers; the inhabitants of towns and cities by the product of their labor reaching the rural districts more economically. This is a fair, analogous deduction from the history of the reduction of freight rates by the improvement of roadbeds and rolling stock, to which much of what science, experience and invention have developed has been been applied.

The history of good road construction all over the world reveals only a few fundamental methods. The Romans laid down large, flat stones. Then in France rough stones were set on edge, a layer of broken stone being superposed. A similar theory was later followed in England. Early in the nineteenth century McAdam announced the principle that small pieces of broken stone placed in a layer are, by the action of water and travel, transformed into a more or less homogeneous road surface. Two or three generations afterward the road covering effect of crude oil became known.

It is now pretty generally recognized by highway engineers that the macadam road is, for modern conditions, obsolete, and that from now on first-class roads must, by the admixture of proper ingredients, have a mastic property, by virtue of which dustless roads will become a

reality and undue depreciation from disintegration of the road be avoided.

The good roads problem, although precipitated by the automobile, has been left alone for generations and extends in its far reaching importance and effect much further than the consideration of its relation to the automobile; in fact, as far as any economic question can reach. The automobile is broadly a medium of communication and traffic, upon which the very life of the nation depends. Roads are simply media for facilitating traffic, incidental to animate and mechanical road traction, and not an end in themselves. This last should be obvious, but some seem to think the preservation of roads out of date for modern purposes is the great desideratum. But progress in fundamental matters cannot wisely be impeded by incidental considerations. It is clear that the automobile is an improved method of accomplishing a fundamental function.

Our roads of the present day were developed for horse drawn traffic, in the case of which the elements affecting the making and preservation of roads are materially different from those of automobile traffic. The effect of horse hoof impact is plain. The effect of rolling and driven motor wheels is, in great part at least, understood. It is a fact that for the same speed an automobile injures a road less—at least no more—than a horse drawn vehicle. On a properly built road the effect of automobile traffic is beneficial, not injurious. Very few well informed highway engineers will state that the automobile alone injures an ordinary macadam road more than a horse drawn vehicle alone. The rapidly growing theory is that the meat of the problem lies in the combined horse and motor traffic—horses cutting up the roads and automobiles stirring up and displacing the material thus cut up. The automobile is not an abnormal or flagrant offender even on roads which were never constructed for it. Even if it were more of an offender it must, as a medium of progress, be provided for adequately.

An irresistible movement for the construction of good roads is under way in this country. The members of the highway commissions in many States are high grade, able men, bending every energy to road progress, finding the best specifications for modern roads, and how to construct and maintain them. The United States Department of Good Roads is doing a great deal of efficient work, having recently commenced a series of tests, co-operated in by members of the Association of Licensed Automobile Manufacturers, to secure reliable data on the actual effect of automobile and horse drawn traffic on roads. There are many technical and financial problems in the whole large question, which problems, it is very gratifying to note, are being taken up in a rational, thorough and in all probability successful way.

[NOTE BY THE EDITOR.—The above article is commendable in many respects. The necessity of better roads cannot be too strongly urged. We thoroughly agree with the author that "for the same speed" an automobile injures a road less than a horse drawn vehicle. But this means a speed of not over 10 miles an hour. How many automobiles run at this low rate of speed on country roads or even through city streets? On country roads the speed of automobiles is usually over 30 miles an hour, and the man on the road side needs no qualifications as an expert to enable him to decide that the road would have to be constructed of materials so far unknown in road making to resist injury successfully.]

The Shenango Furnace Company, Pittsburgh, in an attractive pamphlet with the title, "Ore Analyses," gives the guaranteed analyses of its ores on the Mesaba and Menominee ranges, Lake Superior. The latter are the well-known Clifford and Antoine silicious ores. On the Mesaba range are the Shenango, Tyrone, Webb, Whiteside and Wilpen ores. Illustrations are given of the stockpile at the Shenango mine, Chisholm, Minn., and of the open pit of the same mine, both methods of mining being employed. Views are also given of the steamer Wilpen, the coke works at Wilpen, Pa., and the large No. 1 furnace at Sharpsville, Pa. W. P. Snyder & Co., Pittsburgh, sell the products of the company.

* Association of Licensed Automobile Manufacturers, 7 East Forty-second street, New York.

HARDWARE

TRADE questions are always more complex than they appear on casual or superficial observation. They reach out in directions which are not at first recognized. Practices which seem to serve immediate interests are often in the long run disadvantageous and hurtful. The good attained is at the cost of later injury. When the catalogue house business was encouraged by the jobbing trade and by some manufacturers, who first supplied the articles so distributed, a fair profit was doubtless realized and money made on the transactions. When the retail trade were aroused to the dangers of this kind of competition the merchants and manufacturers who supplied the catalogue houses were in an awkward position and were forced, as gracefully as they could, to discontinue the practice and, as far as possible, to get away from their record. The development was a troublesome one and its evil effects have not been overcome.

Some individual jobbers found it profitable to employ a resident New York buyer, whose services enabled them to keep in touch with the market and obtain the lowest prices quoted. The practice grew because it was found advantageous, until the system of syndicate buying was thoroughly established, apparently as a permanent feature of business. Some manufacturers who encouraged this method of marketing goods at the outset now regret it and many jobbers wish that their competitors, and especially their smaller competitors, were denied the privileges which they themselves enjoy.

A still more striking example is found in the tendency of jobbers to sell tools and many other goods under their private brands and to the neglect of the manufacturers' brands. For this practice there is doubtless much to be said from the standpoint of the jobbers' immediate interest. It gives the merchant who controls the brand and to some extent poses as a manufacturer some of the advantages which under normal conditions belong to the maker of the goods. It furnishes him with certain talking points of which his salesmen can make good use. It enables him to give his customers a line in the sale of which they will be protected. It also gives him a hold on their trade, as the goods in question can only be obtained from him. There is for jobber and retailer in many cases a better profit because the prices on these goods are not cut by competition. These and other considerations in favor of the sale of private brand goods by the jobbers must in fairness be recognized. The wide and increasing sale of special brands is to be accounted for in the fact that their sale by the jobbers pays. It has been found good business to handle their own brands and to give up in similar degree the sale of the goods which bear the manufacturer's stamp, getting some of the benefit which used to be enjoyed by the manufacturer without the trouble and risk which are inseparably connected with the actual fabricating of the goods. Therefore, it is that nearly every jobbing house, large or small, has its own special brands on a multitude of articles which in quality are good, bad and indifferent. The tendency, too, is naturally still asserting itself, and the smaller jobbers and the large retailers are reaching out for the same advantages, and, not satisfied with carrying the brands of either the manufacturers or the larger jobbers, are adding their own to the bewildering variety, bringing about a situation which presents to

manufacturers in many lines one of the most serious problems with which they have to contend.

In at least one important line the percentage of special brand goods represents more than 95 per cent. of the manufacturers' entire output. There are indications that this condition and this tendency cannot continue indefinitely. The situation so far as the manufacturer is concerned is evidently becoming intolerable. The utterance on this subject which was made in Pittsburgh at the recent convention and printed in full in our last issue is extremely significant. It was there stated that manufacturers may be driven to reach the retail trade directly with their best goods instead of endeavoring as heretofore to sell them through the jobbers. The fact that it is a matter of life and death for the manufacturer to establish a reputation for his products, and the further fact that in making special brand goods he is unknown and can make no reputation, are influences which as a simple matter of business make it necessary for him to find a way, if a way can be found, by which his products, fashioned with his best skill and bearing his name, can be given a place in the market, which they are denied under the existing and increasing system of jobbers' special brands. If the manufacturers are forced by the jobbers themselves to adopt the policy of direct relations with retail trade it will be a severe blow to the business of the jobbers. It will be accentuating and accelerating the present drift toward such direct relations. If this should occur the summing up of the whole matter might be: The jobbers made something through the sale of their special brands, but they lost more, not only in the interruption of cordial relations with manufacturers but in the undermining of the broad principle that they are to be the distributors of manufacturers' products to the retail merchants. It is thus possible that in the long run in this matter of private brands it may appear that they were penny wise and pound foolish.

Condition of Trade.

Without any radical change in the situation, there seems to be a steady improvement in the general condition of the market and a growing confidence in the future of the business. The developments of the past week, so far as they reflect or influence commercial or industrial matters, are distinctly favorable. There is an increased confidence that the harvests will be ample and will furnish a substantial basis for renewed prosperity. The entering of the railroads into the markets of late is unquestionably a good sign. The restoring of full wages where cuts were made a few months ago is another pointer toward a greater volume of business and sustained values in Iron. In the financial field, and as indicating something of the volume of transactions, the increase in bank clearings as compared with former records is significant. Taking a broad view of conditions, the outlook is thus promising, notwithstanding the fact that trade in many lines does not show large volume and is indeed in some branches lighter than a few weeks ago. This is accounted for in large measure by the continuance of the conservative policy which has been pursued for nearly two years and which has had so much to do in clearing up the situation and preparing for better times. The delay in tariff legislation must also bear

some blame for sluggish trade movement. The vacation period, too, is at hand, and is beginning to make its influence felt. In the Hardware field there is little news to report. Values generally are fairly steady, but manufacturers are desirous of booking orders, and in a good many lines are ready to make concessions where there is definite business in sight. Some goods like Wire Nails and Wire products are held very firmly, and on Hardware as a whole values generally are well maintained.

Chicago.

Aside from the fact that improvement in a greater or less degree continues to characterize trade movements in Hardware lines generally, there is little of specific interest to note in the developments of the past week. In fact, there is nothing in present or prospective conditions of the immediate future that gives promise of unusual changes, favorable or otherwise, for already signs of diminished force in the push for business are beginning to make their appearance as a result of midsummer vacations which are reducing the ranks of active workers in all departments. If for the next six or eight weeks trade holds fairly even, it will fulfill all reasonable expectations for this period. In the meantime a large volume of goods, principally Wire Nails and Fencing, will be moving in consequence of the heavy orders placed last month. What proportion of these shipments will find immediate distribution to consumers is not clear, but considering the lateness of the season it is fair to presume that stocks in the hands of both retail dealers and jobbers will be considerably augmented by these shipments. Under such conditions a further advance in the price of Wire and Wire Nails would perhaps not be regarded with disfavor by the distributing interests. What view the manufacturers may take respecting the wisdom of such action is as yet merely a matter of conjecture. Whether the intimations of another advance in the near future of \$1 or \$2 a ton is realized or not, new demand is not likely to be much affected in either case, since buyers have pretty generally covered their requirements for the next six or eight weeks at least. Automobile accessories are gradually working into Hardware stocks, and where selected with discriminating care, backed by careful observation of the essential requirements of this trade, are found to be a source of profit. Many of the country garages equipped for repair work are not suitably fitted or arranged for carrying many articles in common demand by automobilists, such as Lamps, Goggles, &c. There seems to be no valid reason why a much larger share of such business might not be diverted to Hardware stores if more determined efforts were made by them to secure it.

NOTES ON PRICES.

Wire Nails.—Demand is considered somewhat greater than is usual at this season and is doubtless stimulated somewhat by the possibility of an advance in prices of Wire products, which while not definitely expected would not surprise the trade at any time. Most of the large houses and many of the smaller ones have covered their requirements for some time to come at the \$1.60 price, and heavy shipments are being made on these orders by the mills. It is not probable that orders placed now will be executed immediately, as mills already have a large tonnage on their books and are accepting business for shipment at their convenience, insisting that specifications accompany orders. Prices are firmly maintained and the market is in excellent condition, with a strong tone. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$1.70
Carload lots to retail merchants.....	1.75
Less than carloads to jobbers.....	1.75
Less than carloads to retail merchants.....	1.85

New York.—Business is somewhat irregular and spasmodic, as some days show a larger demand than others. A fair quantity of Nails, however, are being disposed of. Wire Nails are held in small lots at store at \$1.90 per

keg, base, but concessions in some form are occasionally made if a number of kegs are purchased.

Chicago.—New demand is growing lighter, and from now on until fall buying begins will form an inconspicuous part of the tonnage entered. At the same time there is more of such business being placed than is usual so late in the season. July and August are ordinarily dull months in the Wire Nail trade, but are likely to be less so than usual this year. Specifications are pouring in and shipments are heavy. There is no change in the firm attitude of the mills respecting prices, which are uniformly maintaining the rate of \$1.70, base, Pittsburgh, established May 15. The general opinion is that any departure from the present price will be in the nature of an advance. We quote as follows: \$1.88, Chicago, in car lots to jobbers, and \$1.93 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—That consumers and the trade generally are apprehensive of an early advance in prices of Wire products is shown by the fact that orders continue to come in freely, in spite of the fact that very heavy contracts were placed prior to May 15, when prices were advanced. While nothing official has been given out in regard to an advance, this is generally anticipated by the trade and may take effect at any time. The mills are still pursuing the policy of entering orders only when accompanied by specifications, and for shipment at convenience of the mill. The tone of the market is firm, and we are advised that prices are being absolutely maintained. We quote Wire Nails at \$1.70 per keg, in carload and larger lots, f.o.b. Pittsburgh.

Cut Nails.—Improved conditions in the market are accompanied by a firmer tone, as manufacturers are unwilling to make as large concessions from regular quotations as they have been. There is more new business coming to the mills and specifications on contract orders are being received more freely. Regular quotations, which have been merely nominal for some time, are still open to concessions of, perhaps, 10 cents per keg from the regular quotation of \$1.80 per keg, base, f.o.b. Pittsburgh, for carload lots. Iron Cut Nails are held at and advance of 10 cents per keg over Steel Cut Nails in the Western market, but in the East this differential is not observed.

New York.—Demand for Cut Nails is moderate in the local market. Nails are held in small lots at store on the basis of \$1.90 per keg.

Chicago.—Slow, but steady, improvement in the demand for Cut Nails is reported, and the outlook for a continued broadening of the market is more encouraging than for months past. Except in Shingle Nails the movement of Cut Nails is little affected by building construction, but the more active work in car building now in anticipation will mean larger consumption. There has been no actual advance in prices, but they are sensibly firmer and the mills are less disposed to make concessions. We quote as follows: In car lots, to jobbers, Iron Cut Nails, \$2; Steel Cut Nails, \$1.80.

Pittsburgh.—We can report an improved condition in the Cut Nail market, demand being larger than for some time. Specifications against contracts are coming in quite freely to the mills and prices are firmer. It is said that the Cut Nail mills are stiffer in their ideas as to prices and are not willing to make concessions now that would have been made a month or six weeks ago. We continue to quote Cut Nails at the nominal price of \$1.80, f.o.b. Pittsburgh, but this is still being shaded, although probably not over 10 cents a keg. Iron Cut Nails command an advance of about 10 cents per keg, but very few of these come into the Pittsburgh District.

Barb Wire.—The new business being received by the mills is becoming lighter as the season advances. Shipments against orders placed at the low price early in May are being made by the mills in large volume. Prices are well maintained at regular quotations, which are as follows, f.o.b. Pittsburgh:

	Painted.	Gal.
Jobbers, carload lots.....	\$1.70	\$2.00
Retailers, carload lots.....	1.75	2.05
Retailers, less than carload lots.....	1.85	2.15

Chicago.—There is comparatively little new buying, since the season, already unusually prolonged, is about closed. With specifications being offered in large volume the question of deliveries is now to be considered. The leading mills are beginning to fall behind in shipments, and their capacities are likely to be taxed for several weeks in the execution of contracts against which specifications are now coming in. Prices are reported to be absolutely maintained. We quote as follows: Jobbers, Chicago, car lots, Painted, \$1.88; Galvanized, \$2.18; to retailers, car lots, Painted, \$1.93; Galvanized, \$2.23; retailers, less than car lots, Painted, \$2.03; Galvanized, \$2.33; Staples, bright, in car lots, \$1.88; Galvanized, \$2.18; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The volume of new business being placed with the mills is lighter than for some time, due to the fact that the season is pretty well over and consumers pretty well covered their requirements prior to May 15, when prices were advanced \$2 a ton. Shipments against these orders have been heavy by the mills, and there is still a good deal of tonnage to be filled. Prices are firm, and we quote Galvanized Barb Wire at \$2 and Painted at \$1.70 in carloads and larger lots, f.o.b. Pittsburgh. It is the general impression that an advance in prices on Wire products may come at any time.

Plain Wire.—Some new orders are being placed, so that a larger business is going to mills than is usual at this season. Shipments on orders booked early in May are heavy. The market is firm and quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of \$1.50 for Plain and \$1.80 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the usual price to retailers being 5 cents additional:

Nos.	0 to 9	10	11	12	12½	13	14	15	16
Annealed.....	\$1.50	1.55	1.60	1.65	1.75	1.85	1.95	2.05	
Galvanized.....	1.80	1.85	1.90	1.95	2.05	2.15	2.55	2.65	

Chicago.—Some new orders are being placed, but the bulk of the business coming to the mills is composed of specifications against the heavy contracts placed at the low prices ruling prior to May 15. Shipments are extremely heavy, and manufacturers of Fencing and other goods calling for Plain Wire are busily engaged. Prices are very firm at the following quotations: Car lots, to jobbers, \$1.68, base, f.o.b. Chicago.

Pittsburgh.—The season is pretty well advanced, and the volume of new orders being entered by the mills shows a falling off, but specifications against heavy contracts placed in the first half of May are coming in freely and shipments by the mills are heavy. The trade anticipates an early advance in prices of Wire products, and for this reason is buying more freely than usual at this season of the year. The tone of the market is firm, and we quote \$1.50 for Plain and \$1.80 for Galvanized Wire, f.o.b. Pittsburgh, in carloads and larger lots, subject to the usual terms.

Chisels and Drawing Knives.—While there has been some irregularity in the prices of Chisels and Drawing Knives, the market appears to be getting in better shape. Some extreme quotations have been withdrawn and the manufacturers are conferring in regard to the situation.

Carriage Bolts, Machine Bolts, Nuts, &c.—The manufacturers of Carriage and Machine Bolts, Nuts and related lines last week confirmed existing prices, which, however, are not strictly adhered to, the market being characterized by some irregularity. The volume of current business is only moderate.

Stove and Tire Bolts.—Prices on these goods are generally well maintained and have recently been reaffirmed by the manufacturers. Some good orders placed by large consuming interests have much to do with the steadiness of the market.

Picks and Mattocks.—There is a tendency toward irregular prices in Picks and Mattocks, and the trade is wondering what the manufacturers will do about it and whether the result of their conferences will be to restore former quotations, which are regarded as reasonably low in view of the cost of the goods.

Cast Iron Hollowware.—The market on this line, the

sale of which seems to be steadily diminishing, continues somewhat uneven, with a rather weak tone in view of slightly increased concessions on orders which appear at all attractive.

Brass.—Base prices on Brass materials were advanced June 21 ½ cent per pound, making high Brass Sheets 14½ cents and high Brass Wire and high Brass Rods each 14¼ cents per pound. No change has been made in brazed Brass Tubing, which remains as before at 20½ cents per pound, base.

Sash Weights.—There has recently been in Sash Weights a good volume of business, and with the strength of the market for the raw material prices for Weights have been slowly but steadily advancing. The amount of building which is going on has made a demand which has taxed the capacity of some of the foundries. Under these conditions the market has a firm tone and it would not be surprising if further advances were made in the near future. The manufacturers are, however, disposed to be conservative in this regard.

Rope.—Business continues in fair volume, made up almost entirely of comparatively small quantities. Prices of various kinds of Hemp continue about the same as last week, with a tendency on the part of Manila Hemp to advance, owing to more active buying by cordage manufacturers. The market may be represented by 8¼ to 8½ cents per pound, base, for Pure Manila of the highest grade and a corresponding quality of Sisal at 7½ to 7¾. Lower grades of Pure Manila can be purchased at ¼ cent less than the foregoing quotations. Second grade Sisal is quoted at 6½ cents and third grade at 6 cents per pound. Jute, ¼ in. and up, No. 1, is quoted at 6¼ to 6½ cents and No. 2 at 5¼ to 5½ cents.

Linseed Oil.—New business is light owing to the continuance of high prices, buyers preferring to take the market as it is when obliged to purchase. Withdrawals on contract orders by Paint manufacturers and jobbers are fairly active. No change in card prices has occurred, but possibly 59 cents could be done on large lots of Western Raw. Quotations for 5 bbl. or more are as follows: State and Western Raw, 60 cents per gallon; City Raw, 61 cents per gallon, with the usual advance of 1 cent for less than 5-bbl. lots. Boiled Oil, 1 cent advance on Raw.

Spirits Turpentine.—The local market remains firm on advices of steadier conditions in Savannah. Higher prices are regarded as possible. The New York market is represented by the following quotations: Oil Barrels, 43 to 43½ cents; Machine Made Barrels, 43½ to 44 cents per gallon.

Window Glass.—The dullness which has characterized the market for some time continues, with no prospect of immediate improvement. Buying from manufacturers is on the hand to mouth plan, and quotations from manufacturers' list, January 1, 1901, are understood to be about 90 and 40 per cent. discount on Single and 90 and 40 and 10 per cent. discount on Double Strength. Production is on the decrease, and it is thought that by the end of this month there will be somewhat of a general closing of factories, although it was reported some time ago that many had plans for continuing in operation during the summer. Prices recommended by the Eastern Window Glass Jobbers' Association, from jobbers' list, October 1, 1903, for territory east of the Mississippi are as follows: New England and Middle States, from jobbers', Single, 90 and 35 per cent.; Double, 90 and 40 per cent.; factory shipments, Single, 90 and 45 per cent.; Double, 90 and 50 per cent.; some portions of Pennsylvania are accorded discounts 5 per cent. better than other States; in the Southern States discounts vary from 90 and 25 to 90 and 40 per cent. on Single and from 90 and 30 to 90 and 45 per cent. on Double, from jobbers.

THE SIMPLEX LOCK & HARDWARE COMPANY, 1 Hudson street, New York, is the title of a new firm lately formed for putting on the market various specialties it controls, including Bathroom Specialties, Locks and Door Checks. It is the intention to add to the list from time to time as conditions warrant.

THE QUESTION BOX

This department is open for the discussion of questions which arise in the practical conduct of the Hardware business. Our readers are invited to contribute, submitting inquiries or answering questions.

Correspondents are expected to give their names and addresses, but in order to encourage frank expressions of opinion the advice of our correspondents will be treated in confidence, names and addresses not being published.

For convenience, Questions or Answers should be addressed to THE IRON AGE QUESTION BOX, 14-16 PARK PLACE, NEW YORK.

Pricing Malleable Iron Fittings.

What is the best arrangement for price cards or price books of Malleable Iron Fittings for use in charging for work done in the shop and also for retailing in the store?

In sending in this inquiry our correspondents, an enterprising house in New York State, thus explain what they are looking for and also make a suggestion which is of interest. Replies are solicited:

We have in mind the finding out of the proper method of pricing Malleable Fittings on a price card or in a price book so that the list may be compact and take up less space than is used by Fitting makers in their catalogues.

The writer has an idea of getting a list out with the different kinds of Fittings and grouping them into classes, not in respect to their names or nature, but in respect to the retail price, thus putting the entire stock of Pipe Fittings into about four or five classes or groups. This is for quick reference in selling at retail. Below is an example showing three classes of Fittings:

Group 1.	Group 2.	Group 3.
¼-in. plugs.	¼ crosses.	½ unions.
¾-in. plugs.	¾ tees.	½ unions, crosses.
½-in. plugs.	½ tees.	&c.
&c.	¼ ell.	
	¼ x ¾ bushings.	
	&c.	

My idea is that group 1 should be priced at 5 cents each, group 2 at 10 cents each and group 3 at 15 cents each.

This is merely a poor example of what I want to find out. Is there any way to group Fittings in this manner so that cost and retail prices can be readily ascertained without doing too much detail? When I use the above word cost and retail I mean approximately.

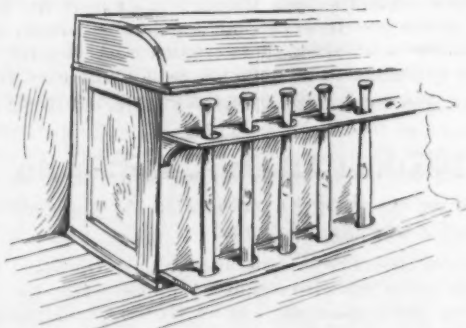
There are methods in use, no doubt, which could be brought out in discussion of this subject which would be of vital interest to many, and we hope we may hear from your readers.

Displaying Baseball Bats in the Hardware Store.

The question as to desirable methods of displaying Baseball Bats in the retail store continues to attract attention. In addition to the methods we have described in recent issues we lay before our readers illustrations, for which we are indebted to Hardware merchants in Illinois and Mississippi. It is certainly interesting to observe the various ways in which these goods can be handled in the Hardware store and the ingenuity of merchants in bringing them effectively to the attention of their customers.

FROM AN ILLINOIS MERCHANT: A row of Ball Bats, unusually long and well displayed in a counter rack 4 in.

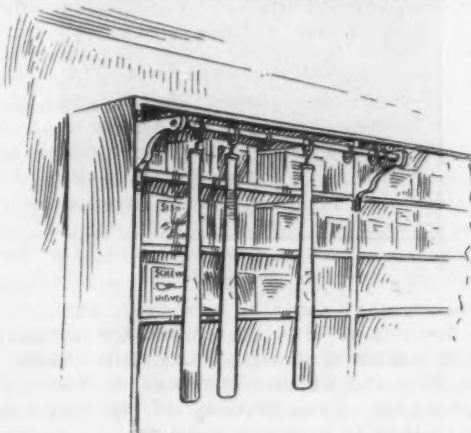
wide is the plan of an Illinois Hardware merchant, economically to show and automatically to sell Bats. The showcases on the counter are 30 ft. long, containing Fishing Tackle, Ball Mitts, Balls, &c., and on the front of the counter is a board 4 in. wide on brackets, another



Baseball Bats Displayed in Rack 30 Ft. Long and 4 In. Wide, Holding Six Dozen Bats.—An Illinois Merchant's Plan.

board 4 in. below being of the same width. Holes 2¾ in. in diameter accommodate 6 doz. Bats, displaying them to good advantage and occupy hardly any space. The Bats have the selling price marked on them in plain figures, so that boys and men seeing the price can wait upon themselves in making selections.

FROM A MISSISSIPPI MERCHANT: The plan in use by a Mississippi Hardware merchant is also shown, the Bats being suspended in front of shelving immediately back of a show window. A pole supported by brackets and supplied with curtain rings affords an excellent arrange-



Baseball Bats Suspended from a Pole by Curtain Rings and Screw Hooks Within Easy Reach of Salesmen.—A Mississippi Idea.

ment to make a display of this class of goods. Screw Hooks are screwed into the small ends of the Bats, which are hung on the rings. The Bats are in full view of customers entering the store, yet out of their too easy reach, and not accessible for miscellaneous handling by boys.

Rent as Part of the Cost of Doing Business.

Should a corporation conducting a business in its own building, on its own property, consider, in estimating the cost of doing business, rent on the property?

Since it is necessary to have a building in which to carry on the business, it is obviously reasonable that the rent should be taken into account in estimating expenses. Whether the building is owned by the concern or simply rented does not affect the principle involved. There is a good deal of diversity in the way in which this question is regarded by accountants, but certainly so far as the estimating of the general expenses of carrying on the business is concerned, it is desirable that care should be taken to get them high enough, because of the tendency of competition to force selling prices down to a point

where there is not sufficient margin left between the invoice cost of the goods, plus their proportion of general expenses, to yield a profit on transactions. In this connection it will be remembered that rent is named in the admirable blank enumerating the elements which enter into the merchant's costs which was printed in our last issue. There are, however, many concerns which, if they own their own building, do not count rent on it as a part of their expenses. The question is of much practical importance and we invite expressions from the trade.

Death of Albert A. Heizmann.

ALBERT A. HEIZMANN, one of the founders of the Penn Hardware Company, Reading, Pa., who for a number of years was prominently identified with the Builders' Hardware manufacturing industry, died suddenly on Monday, June 14, at Southern Pines, N. C.



ALBERT A. HEIZMANN.

Born in Reading in 1848, he received his education in the private schools of Reading, St. Mary's College, Wilmington, Del., and at the University of Notre Dame, South Bend, Ind. From 1870 to 1877 he was engaged with his brother, C. Raymond Heizmann, in the jewelry business. In 1877 the two brothers established the Penn Hardware Works for the manufacture of Builders' Hardware, and in 1879 they disposed of the jewelry business, thereafter devoting their entire attention to the manufacture of Builders' Hardware. In April, 1896, they incorporated the Penn Hardware Company, of which Albert Heizmann was elected treasurer and director. He was largely instrumental in the growth and development of the company.

In addition to his identification with the Penn Hardware Company, he was prominently identified with the government and progress of his native city, having served creditably in both branches of councils and as president of the Board of Water Commissioners. He was also one of the founders and directors of the Keystone Bank of Reading. After a long and successful business career ill-health compelled him in 1901 to resign as treasurer of the company. He was a brother of Theodore I. Heizmann, formerly chief engineer M. W. of the Pennsylvania Railroad Company, and of Col. Charles L. Heizmann, Assistant Surgeon General, U. S. A., retired. For the last five years he resided at Southern Pines, N. C. He leaves a widow and five children.

The Success Hardware Company, Los Angeles, Cal., has been incorporated with a capital stock of \$10,000, to succeed the firm of Vorhees & Son, the incorporators being John A. Murphy, G. A. Murphy, Ray E. Vorhees, Charles McClure and Charles Ewing.

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THE ARKANSAS CONVENTION.

THE tenth annual meeting of the Arkansas Retail Hardware Association is now in session at Fort Smith. An interesting programme has been prepared for the meeting and the gathering promises to be a very enjoyable and instructive one. The formal papers which will be read during the convention have to do with the retail Hardwareman's advertising, the cost of doing business, profit afforded by the sale of Cream Separators and profits generally. A good deal of discussion will also come up through the medium of the Question Box, many topics having been submitted for consideration under this head. We give below extracts from the interesting address on retail advertising by H. T. Benham, which was delivered at the Tuesday morning session.

Retail Advertising.

Merchants Should Be Alive to Its Necessity and Opportunities.

Co-operation by and with Manufacturers.

EXTRACTS FROM A PAPER BY H. T. BENHAM, ADVERTISING MANAGER OF E. C. ATKINS & CO., INDIANAPOLIS, IND.

Just what is advertising? Where does it begin in the ordinary business and where shall it stop?

My conception of the subject is so broad that I believe there is no man in business to-day, no matter what its nature nor environments, but who is vitally interested in its ramifications.

The all wise practitioner will tell you that it is contrary to medical etiquette to advertise, but sly old Dr. Killum's fox, he is full of it. He does it first by hanging out a modest shingle, whose very modesty and apparent age stamps it at once as a strong bid for business.

Advertising? Yes. See him ape the characteristics of his colleagues. He would scorn an advertisement in the newspapers, but see him chuckle when an item mentions the recovery of some unfortunate through the prompt and efficient services of Dr. Killum.

The dealer in the small town doesn't advertise. True, he does not in the same manner as the man in the larger centers. But if he is successful, I want you to mark the appearance of his merchandise. I want you to look at his windows, to the arrangement of his goods, to the conduct of his clerks, to the life and snap and ginger that is instilled into his salesmen, to the prominence that is given to those goods which the manufacturer is advertising for him.

That man is an advertiser and a mighty good advertiser, too. For he is using good judgment and taking advantage of his opportunities.

Consider now the successful merchant in a larger community. He has perhaps some competition. His volume of business is somewhat limited. There are just so many customers to be supplied and then he has reached the limit of possibilities.

What does he, you ask, what can he do? Why, I'll tell you; he can do just what the catalogue houses do so successfully; he can create desires in the minds of his customers for new things which he has for sale and turn those desires into needs, and then he can go further and show these people

how easy it will be to supply those needs which he has created, if they will only apply to him.

For example, there was no need for Safety Razors, no demand for them, until a few years ago. People were content to shave in the same old way. But a few enterprising advertisers set about to create that need. How well they have succeeded is so apparent that it will require no elaboration from me.

Now, let me ask you a question: How many of you are selling Safety Razors to-day? How many of you are taking advantage of the demand which the manufacturers of Safety Razors created? And if you do sell them, how are you going about it?

Have you a sixth of a dozen in a box on a high shelf or even in a showcase (which perhaps needs cleaning) or we will say the showcase is clean? Have you simply laid these things away, waiting for a "call," or are you telling your people "Here you are, I can sell you that Safety Razor which you have made up your mind to buy. Come to me; I'll make it easy for you to buy."

Here is new business created for you to swell your sales in a limited community where your possibilities are restricted. Are you taking advantage of it or are you permitting that customer to take all the unnecessary trouble and extra expense of going to the post office or express office and buying a money order and sending the money which should come to you to Chicago or New York or some other place where it does not rightfully belong?

Are you "asleep on your rights" and your opportunities? What is true of Safety Razors is true of thousands upon thousands of commodities within your scope. Are you alive to your opportunities?

Now, how can I be more alive? you say. I am doing all I can. I cannot afford to advertise.

I say if you cannot afford to advertise your business you should advertise your business for sale.

Advertising an Investment.

Advertising is a modern necessity, absolutely essential to business success and should be so considered in the establishment of every new enterprise and in the conduct of every old one. It should receive the same attention as your appropriation for rent, help or any other necessity, and the amount invested as carefully censored as any other item.

I believe that every merchant should determine at the beginning of his business year the sum that he can afford to use for the establishment of publicity and his reputation through legitimate advertising. This sum should be based either upon past experience, or if a new enterprise, upon anticipated sales—a certain proportion, which of necessity will decrease as your sales become greater.

Just what this percentage should be it is not my province to say, because conditions vary, but let it be a fixed sum which you feel that you are justified in investing. Observe, I say investing, not expending, because this investment is an asset just as tangible as any other. Your name, your reputation, your good will, your prestige, is all valuable and will bring a consideration at any time.

Now, because Jones or Smith or Brown in your community are pursuing a certain line of publicity, it should be of some guidance to you, but it is not essential to copy their methods. Select, however, some line of action that you think will bring you in closest touch with the people to whom you wish to sell. Arrange your plans accordingly and with the idea of being systematic and persistent.

Spontaneous advertising is good; any kind of real advertising is good, but persistence is essential to results. Your plans, therefore, contemplate the reaching of your customers at regular stated intervals, each time with a message of interest to them, each time with some inducement, some news which will make its impression.

Appeal to them from one of two standpoints, either



H. T. BENHAM.

quality or price. If quality, tell them why your goods are the best—make it plain. If price, show what others charge; make it emphatic. But go after the business regularly and intelligently and persistently. Talk to them as you would if they were with you, face to face. But don't miss going after them regularly, persistently.

Conduct your advertising as you do your business and don't put it off to the last thing and then give it a lick and a promise. It is worth more to you, it is vital, it has become a necessity, the only sure way to success.

I am not here to tell you what medium to use. Your conditions vary. For some it may be best to use your local newspapers; for others, hand bills, carefully distributed, or signs or letters or what not. For others all these mediums may be successfully used. But the main thought I wish to leave is that some definite plan should be determined upon and then executed religiously, rigidly, persistently and within the sum which you have appropriated for the purpose. Do not be discouraged if results are not immediately apparent. The chances are they will not be. But if you are persistent and conduct your plans intelligently they will be apparent at the close of the year and I assure you on the right side, too.

As to the selection of your mediums for advertising, use common sense. Size up your local conditions, study your people, their lives, their habits, their desires. Think it over carefully; I might say prayerfully. Don't be in a hurry, but decide upon a plan of action which you can afford to carry through to a finish, each day or each month as the case may be, but persistently—and then stick to it.

Should you wish advice or assistance, any of the large advertisers from whom you are buying will be glad to counsel you and help you. Most of them will furnish free, attractive advertising matter, signs, circulars, booklets, window trims, and many supply ready-made advertisements or will write them for you if you wish. I am a great believer in the personal appeal and where you can afford to do so, a select mailing list is an essential. Many large advertisers will even go so far as to mail advertising matter to your list free of charge. Take advantage of all these helps, which are free, and supplement them by persistent personal effort and you will be, if not surprised at the results, at least assured of ultimate success in your community.

The ideas I have advanced are not new, not theories, not speculative, but are based upon facts—actual accomplishments and certainties.

National Advertising Campaign and the Merchant's Co-operation.

Mr. Benham then described the manner in which some large advertising campaigns are planned and conducted. Referring to the co-operation of the merchant in this connection, he continued:

He, therefore, comes to you with as near a certainty as it is possible to secure. If you will join him and will receive his helps, if you will co-operate along the lines he maps out for you, if you will take advantage of his experience which he has bought legitimately and paid for, if you will do these things, why then I say you may expect results sure and certain.

Now, the reverse is not true. If you do not buy, it is your own business; if you are convinced that it is good judgment to keep your hands off, that's your affair.

But what I do want to emphasize is that if you do buy advertised goods, or if you have now in your store certain lines of goods that are being advertised nationally by the makers, you owe it to yourself, your family and your community to take advantage of the helps that are yours for the asking. Let us see how the thing works out. With the delivery of these goods has come a selling plan. You have been told first how to arrange them so as to create the most favorable impression. You have been supplied with signs and window trims and told how to use them. You have been given attractive folders, booklets and printed matter, convincing stuff, which has been tried out and

found to produce. The whole sales plan has been worked out for you on a sure, result-giving basis.

The goods arrive, the plans are executed and what follows? Why, can't you see? They move off your shelves. You are working along lines from which the elements of uncertainty have been eliminated. There is no risk—results are sure. Now, who is the better manager, the one who takes advantage of these opportunities or the one who argues—"I am not an easy mark. I don't propose to be a sucker. If these fellows want to advertise their goods, let them create their own demand. I am not going to do it"? Why, my friends, the demand has been created.

These goods, through national advertising and other means, are already a household word. More people than you realize are convinced of their merits and are only waiting for a favorable opportunity to buy.

Successful merchants everywhere realize these conditions and so the national advertiser is encouraged to proceed. More and more dealers realize the advantages of co-operation, but there are a few who will not see; whether this is on account of prejudice or down right indolence, I cannot say. I am thankful, however, that they are few, and we shall hope that even these may be made to realize their error and secure the benefits that are open to them. This is by no means a one-sided proposition. Your profits in dollars and cents are much the greater. The national advertiser helps himself—yes, he knows that, but in doing so he is creating additional business for you and is entitled to your consideration and co-operation.

New Catalogue of William Dixon, Inc.

A CATALOGUE of 672 pages, cloth bound, profusely illustrating and describing fine Tools and Supplies for workers in all kinds of metals, is just being distributed by William Dixon, Inc., formerly F. W. Gesswein Company, 39 John street, New York. The 32 columns of index embrace many diverse lines of goods indispensable to manufacturer and mechanic, the Dixon factory making Brushes, Buffs, Polishing Materials, &c., including also a machine department for producing small machinery, Gravers, Files and Special Tools. There has, likewise, been added a dental and optical department and an arts and crafts department well equipped. Much technical information, tables, compounds, &c., are included for both manufacturer and workman. The company has its own Paris branch, is sole agent for Antoine Glardon's fine Swiss Files, agent for L. Hugonot Tissot's fine Tools and New York agent for the Norton Company, Alundum Grinding Wheels and Machines.

THE POSTAL PROGRESS LEAGUE, James L. Cowles, secretary-treasurer, 361 Broadway, New York, as "a winning postal programme," is advocating a national parcel post, 1 cent for 2 oz., a city letter post, 2 cents for 4 oz., and 1 cent for each additional 2 oz., and a packet service, all matter in one class, within the free delivery routes. For the latter service the limit is the ordinary suit case, 6 x 12 x 24 in., weight 25 lb., the rate for which would be 10 cents. Parcels, 1 x 6 x 12 in., 1 lb., would be carried for 1 cent, and parcels, 6 x 6 x 12 in., 11 lb., for 5 cents.

THE Washington Hardware & Implement Dealers' Mutual Fire Insurance Association, E. W. Evenson, secretary, Spokane, Wash., has issued an effective booklet pointing out the advantages afforded by mutual insurance. It presents portraits of a number of Hardware and Implement merchants insured with the company whose return premiums for the past three years, amounting in many instances to hundreds of dollars, are set forth.

In the report of the National Retail Hardware convention held recently in Milwaukee, the very enjoyable automobile ride tendered the delegates was credited to the Milwaukee local association of Hardware merchants. This was an error, as the host on this occasion was the State Hardware Association and not the city organization.

McLean's Fourth of July.

A Hardwareman Takes a Flier in Fireworks

BY FAR WEST.

THE partners—one weighing 125 lb., the other 300 lb.—toiled along the Hardware highway with the same purpose tucked away in their hearts, but manifestly in different ways. To the casual observer the fat man labored under a severe handicap, as in truth he did, but not as appearances indicated.

For something over 10 years Beese & McLean had dispensed the various combinations of iron, copper and tin that gave Tubal Cain his reputation. By a strange juggling of fate, Beese was the thin and McLean the fat member of the firm. At first the comments about his name, with the accent placed on the last syllable, and his size annoyed him so much that he changed the spelling and wrote and pronounced it Maclane, but without avail. He tried every anti-fat preparation known to science and quackery without losing a pound of flesh. Finally surrendering to the inevitable, he met all comments with a double-chinned smile that proved his best retort.

It was the 13th of the month. The postman had just delivered the morning mail, which McLean cut apart with a stiletto, a souvenir from a Hardware convention, while his partner tore off and thriftily preserved the smooth part of the envelope for use as figuring paper, throwing the other half into the waste paper basket.

Bank Account Somewhat Shy.

"I'll bet we've got the cleanest set of books in town," proudly remarked Beese, as he laid the checks and statements in neatly arranged piles. He collected the bills, kept the books and attended to the financial end of the firm, while McLean was the buyer and worried with the store details. "Our people, with mighty few exceptions," he continued, "come up promptly with the coin every 30 days."

"If our bank account only looked as well we'd be all right," rejoined McLean, apparently busy with his souvenir, but furtively watching the effect of his remark.

Beese shot a quick glance at his partner, but that ponderous gentleman was apparently innocently engrossed with his slicing operation. "Oh, it might be worse," rejoined Beese; "we are getting in enough to pay our bills and, while some of our investments have not turned to immediate profit, it will come all right. Yes, just give them a little time and they'll cash up O. K."

"You may call it investment," said McLean boldly, "but to tie up our spare cash in the stock market when we need it in our business spells speculation to me."

"Speculation!" indignantly exclaimed Beese. "Nothing of the kind. It's this blamed panic that has made all the trouble. If it hadn't been for that we could have sold those stocks at a good profit. Yes! and we'll get it yet; it's only a question of patience."

"We haven't got the money any way," said McLean, lifting up the sheets of a large calendar hanging on the wall. "One, two, three, four, five," he counted in an undertone. "Five reds in May, four reds in June and four reds in July, and all Sundays."

"Now what's gone wrong with you," querulously demanded his partner, "mumbling about reds in July? Have you turned socialist?"

"Not exactly," replied McLean, retaining his good nature. "I'd like to be sort of a firebug, though, but not quite an exterminator. It's the Fourth of July I'm thinking about. That's the next holiday, and we are going to lose some good business just because our hands are tied."

"I don't see how you figure that out," rejoined Beese.

"We don't do much on the Fourth except sell a few blanks, some Hammocks and Freezers. Any way, it's a holiday, and the time to take a holiday is when every one else does."

"There is where you are wrong," exclaimed McLean with animation. "Because we have missed our opportunity in the past proves we ought to wake up now. I've got a scheme. I know there's money in it if we only had the cash, and as for holidays, the time to take them is when there is no business and the time to sell is when people want to buy. Why, there is only one other day in the year when there is so much easy money around as on the Fourth of July, and we've got to sit still and see it go by!"

* * * * *

The local agent of the Queen Powder & Cartridge Company was standing before a gaudy fireworks poster, when McLean entered his office. "There, now!" he exclaimed, "you are at it, too. I can't move but what I see something about the Fourth. Never read of so many powder houses blowing up, and it's all because I want to do something I can't."

"Great speech, Mr. McLean," said Dutton, the agent; "you ought to be the orator for the Fourth and read the Declaration of Independence; funny you should come in just when I was thinking about you; but what's on your mind? Don't you like our poster?"

"Like it?" exclaimed McLean. "Sure I like it—shove that chair over this way; too bad a man of my size has to work. Say, now! that's the finest picture I ever saw; nothing in the art gallery looks as good to me, but then I'm up against it." Saying which he sat dejectedly, looking at the poster with admiring and envious eyes.

"I was just coming out to see you," said Dutton. "Our house has given me the names of some of our best people to let them in on a deal they have made."

"No use, Dutton," interrupted McLean; "I've just come in to stock up on blanks, but we're tied up too tight for anything else."

"Wait a moment," said Dutton, "what do you think about running a line of fireworks for the Fourth?"

"I'm an easy mark," replied McLean. "So don't say a word, why that's my trouble. I want to put in fireworks, but we have no money, so what's the use?"

"A whole lot, everything's the use; listen;" said Dutton, placing before McLean a table filled with packages covered with bright red, blue and green paper. "Our people have bought the entire output of one of the best factories in the country and the plan is to let you have what you want now, payment to be made when goods are sold, in exact terms, July 10."

"It's a go!" exclaimed McLean, excitedly; "that's what I want to do; but hold on—have you ever sold fireworks? Remember this is my first throw and I'll have to be posted."

"Sold fireworks," repeated Dutton. "Sold fireworks! Why, man, I was raised on firecrackers; learned the business right in the factory; sold the goods on the road and over the counter—there's where you make your pretty profit; look at this," holding up before McLean's admiring gaze a tube covered with red paper; "this Devil's Night Cap costs you 38 cents; now what would you mark it?"

"There is good money in fireworks," replied McLean, with a judicious air, "about 75 cents."

"Do you want to give it away?" questioned Dutton ironically. "Here is where you make your money; you can get \$1.25 for this piece—fact! I know it, but where you want low prices is on your firecrackers; sell them at cost and throw in plenty of punk—you can afford to, but boost the price on the fancy pieces."

* * * * *

Beese received the information of the fireworks venture with a stormy protest. "I want you to understand one thing," he remonstrated. "I don't figure in this crazy scheme at all, I'm going to enjoy my holiday like a patriotic citizen, so if you are determined to go ahead with this fool business you do so at your own risk; yes."

"All right," calmly assented McLean, taking the hint. "I'll let you out of this deal entirely if you will agree to this: In consideration of the fact that

Money Easy on the Fourth.

I do the work and take the risk, you make no claim on the profits."

"Quick enough," Beese assented. "You can have all you can get out of it, yes—and I will leave town on the 1st, but you will have to protect me with a fireworks' clause in our insurance."

The agreement was drawn up, duly signed and witnessed, and McLean went ahead with his project. He began by drawing into conversation the young men and the old men, the boys and the girls, and their mothers, getting from each his or her view on how the Fourth should be enjoyed. The result was that, while a safe Fourth, represented by a Freezer of ice cream and a Hammock appealed to the fathers and mothers, the great majority advocated plenty of noise, beginning early and keeping up late, as the only way to observe the great American holiday.

The city ordinance for the observance of the Fourth read that no explosives, cannon crackers, or revolvers should be discharged before the morning of the Fourth. With this in mind McLean advertised widely that promptly at 1 min. past midnight, July 3, the store would be

One Minute Past Midnight.

open for business. This feature became a topic of conversation and brought a great many curious people to the store, with the result that the last week in June showed a tremendous business. Two days before the Fourth, McLean called the clerks around him. "Now, boys," he began, "about this midnight business, there is nothing compulsory about it; it is simply a question of volunteers. I will ask for only two besides myself to come on at that hour—" Before he could finish the entire force, inspired by the novelty of the situation, volunteered their services. But McLean held to his first proposal, accepting the services of two of the clerks, with the understanding that they were to be relieved by the others at the regular time of opening, 7 o'clock.

On the stroke of 12, July 4, the cash register gave the final ring. The clerks had left and the lights in front were switched off, when a large man, minus coat and vest, limped wearily past rows of empty

McLean Earns a Day Off.

counters to the rear of the store. Stepping on the platform of a large scale he slid the weight along the beam until it balanced at 285 lb. A pleased expression spread over his expansive countenance as he exclaimed: "Lost 15 lb.; cleared \$1100—what a glorious Fourth! Now for a day off." Slipping into his office chair, with both feet resting on the desk, he gave a sigh of contentment and fell fast asleep.

Increased Membership of the Southern Hardware Jobbers' Association.

THE Southern Hardware Jobbers' Association, which is the pioneer jobbers' organization of the country, has materially increased its membership during the past 12 months and is doubtless now in a more healthful condition than ever before. Since the 1908 convention nearly 30 houses have been added to the membership roll, including some of the largest concerns in the South, as follows:

Loeb Hardware Company, Montgomery, Ala.
Baird Hardware Company, Gainesville, Fla.
Bond & Bours Hardware Company, Jacksonville, Fla.
Augusta Hardware Company, Augusta, Ga.
Semmes Hardware Company, Savannah, Ga.
A. Baldwin & Co., New Orleans, La.
Lee Hardware Company, Shreveport, La.
Woodward, Wight & Co., New Orleans, La.
Oklahoma City Hardware Company, Oklahoma City, Okla.
Lorick & Lowrance, Columbia, S. C.
Markley Hardware & Mfg. Company, Greenville, S. C.
Elder-Conroy Hardware Company, Clarksville, Tenn.
J. H. Fall & Co., Nashville, Tenn.
H. G. Liscomb & Co., Nashville, Tenn.
Keith-Simmons & Co., Nashville, Tenn.
Buford Bros., Nashville, Tenn.
Morrow-Thomas Hardware Company, Amarillo, Tex.
Walter Tips, Austin, Texas.
W. M. Tatum Hardware Company, Corsicana, Texas.
Huey & Philip Hardware Company, Dallas, Texas.
Peden Iron & Steel Company, Houston, Texas.

Adoue-Blaine Hardware Company, Houston, Texas.
San Antonio Hardware Company, San Antonio, Texas.
Penick & Hughes Hardware Company, Stamford, Texas.
McLendon Hardware Company, Waco, Texas.
R. E. Bell Hardware Company, Weatherford, Texas.
De Haven-Dawson Company, Norfolk, Va.

New England Iron and Hardware Association's Annual Meeting.

THE annual meeting of the New England Iron and Hardware Association was held at Young's Hotel, Boston, on the 15th inst., preceded by the customary dinner. There was a good attendance of members and a spirit of harmony and good fellowship prevailed. The chairmen of the various committees read reports, which showed the different departments of the association to be in a prosperous condition. The treasurer's report showed a satisfactory financial balance, and the report of George J. Mulhall, clerk, gave statistics and interest-



A. B. MARBLE.

ing details of all the meetings, and covered the general work of the organization for the year.

The Nominating Committee submitted a list of candidates for officers, all of whom were unanimously elected. Augustus B. Marble of the Jones & Laughlin Steel Company having completed a successful administration of one year, was prevailed upon to serve again, and Treasurer Charles H. Breck, who has held that office for many years, and George J. Mulhall, the efficient clerk, were continued in their old positions. Several new men were elected directors, including W. H. Dunning of the Dover Stamping Company and C. W. Henderson of the Arthur C. Harvey Company. The following is a complete list of the officers and directors for the ensuing year: Augustus D. Marble, president; E. A. Loomis, vice-president; Charles H. Breck, treasurer; George J. Mulhall, clerk. Directors: C. W. Henderson, W. H. Dunning, R. G. Boutwell, Charles A. Adams, W. B. Willcox, George H. Gray, Frank M. Marvin, F. L. Greeley, C. F. Bragg.

Omissions in Directory.

Charles H. Besly & Co., 15-21 South Clinton street, Chicago, Ill., were omitted from The Iron Age Directory for 1909, lately issued, as manufacturers of Disks for Grinders. They make the Helmet Spiral Grooved Steel Disks which are furnished for all makes of Disk Grinders.

The E. F. Reece Company, Greenfield, Mass., is manufacturing the Reece Screw Plates, Taps and Dies, Tap Wrenches and Bolt Threading and Nut Tapping machines. It also makes Stocks, Taps and Dies, and under this heading the name of the company was inadvertently omitted in the Director.

The Delphos Mfg. Company, Delphos, Ohio, in addition to making Galvanized Sheets, Eave Trough, Conductor Pipe, Oil Cans, Tanks, &c., as noted in the Directory, also manufacture Rolled Roofing, Pressed Standing Seam and V Crimp, both Galvanized and Painted.

Parcel Post Bonus for Rural Carriers.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., June 22, 1909.

WITH the special session of Congress drawing to a close the advocates of a domestic parcel post have begun to plan the campaign that is to be waged during the Congressional recess to influence public opinion in favor of comprehensive legislation next winter. It has been decided that the "entering wedge" shall be a rural parcel post measure, but that the proposition shall not be hedged about by the restrictions heretofore advocated by the Postmaster General, the unconstitutionality of which has been urged so strongly by the best legal authorities that they are now regarded with disfavor by many of their former champions. No further attempt will be made to humbug the public as to the scope of the legislation authorizing a rural parcel post and the limitations that it may be found necessary to place upon it are to be left to the discretion of the Postmaster General.

Representative Sims' Bill as a Basis.

As the basis for the recess campaign, Representative Sims of Tennessee, one of the original parcel post boomers and an advocate of the most radical form of paternalism with respect to postal matters, has introduced a measure which contains no new propositions, as compared with former bills, its significance consisting in the elimination of the restrictions embodied in the Postmaster-General's measure, urged in the last Congress, and in the provision that the head of the postal service shall have authority "to formulate and prescribe such rules and regulations under which such system shall be conducted as may be deemed necessary." The first four sections of the bill were originally drafted for Mr. Sims in the Post Office Department, but the fifth, the closing section, has been added by the Tennessee member for the purpose of securing co-operation of the rural carriers and their friends in the effort to pass the bill. This section reads as follows:

That the compensation of rural carriers be increased to the extent of all receipts for such parcel post service hereby established, on each route, respectively, not to exceed \$300 per annum to each carrier, to be paid under such rules and regulations as may be established by the Postmaster-General.

Carriers Relied Upon to "Work Up Local Sentiment."

The incorporation of this section in the bill on the eve of the Congressional recess is an exceedingly clever stroke, the effect of which must not be underestimated by those who are engaged in opposing parcel post legislation. While it is probably true that the Post Office Department, to which the bill will undoubtedly be referred before it is given serious consideration by the postal committees of the two Houses, will report against the proposition to cover into the pockets of the carriers all the receipts of the parcel post service up to \$300 per annum for each carrier, it must be remembered that the bill will not be considered in Congress until next December at the earliest and that in the meantime the personnel of the rural service will be encouraged to believe that section 5 will be incorporated in the measure should it become a law. The promoters of the bill, therefore, count upon a six months' campaign during which the seductive bait of increased compensation will be held out to all rural carriers to induce them to "work up local sentiment" and bring pressure to bear upon their respective Congressmen and Senators.

It hardly need be said here that if the postal committees should favorably consider this bill the first thing done would be the elimination of section 5. This fact should be impressed upon all employees of the rural service with whom retailers may come in contact, for it may be asserted without fear of contradiction that its sole object is to secure the carriers' assistance in a campaign that, even if successful, would result in their sore disappointment so far as the provisions of this bill are concerned.

Season Hardware Advertising

What Are Retail Hardwaremen Doing to Offset the Advertising of Department Stores?

Their Prices Can be Met.

BY CLARFIELD.

EVERY city department store that carries house-furnishings or garden goods is now and has been using considerable space to advertise these things in the city and suburban papers. What are the local merchants doing to meet this kind of advertising competition? A careful perusal of a number of city and suburban papers published in localities where there are excellent Hardware stores fails to disclose any special effort on the part of the Hardware merchants to meet this advertising of the city houses.

Why Is It?

Why does this condition exist? Is it because the Hardware merchants are not thoroughly alive to the importance of this competition? Probably not, for the trade journals, the traveling salesmen and the Hardware conventions have all discussed this subject thoroughly.

Is it because space in the local papers is too expensive to be profitably employed? Decidedly not; for while this space may seem expensive to those who are unfamiliar with its value, it is nevertheless, on the average, low enough in price to be very profitably employed if the right kind of use is made of it.

Is it because the Hardware merchants are not prepared to compete with the prices of the department stores? To this question also the answer is No. A careful canvass of a number of merchants located very near this kind of city competition shows that their prices average as low or lower for standard goods than those of the department stores.

The weak point with Hardware merchants seems to be in the housefurnishings department. In these lines the department stores buy enormous quantities of seconds and advertise them at very low prices. Many Hardware merchants cannot afford to buy such quantities in addition to their regular stocks, and, on the other hand, they are quite properly unwilling to carry seconds as regular stock.

Hardwaremen Can Meet These Prices.

On of the largest department stores in the country recently published a double column advertisement, 3½ in. deep, in which the following items and prices appeared:

STANDARD GARDEN HOSE—Guaranteed for one season; 50-ft. length, \$4.25; 25-ft. length.....\$2.25					
SPADING FORKS—With D handle; extra strong; at 49c					
POULTRY NETTING—In 75-ft. and 150-ft. lengths; No. 20 wire and 2-in. mesh—					
In. wide.	75-ft.	150-ft.	In. wide.	75-ft.	150-ft.
12.....	62c.	\$1.00	36.....	\$1.65	\$3.00
18.....	85c.	1.50	42.....	1.90	3.50
24.....	\$1.05	1.85	48.....	2.00	4.00
COMBINATION HOE and RAKE—6-tooth, at..... 22c					
WEEDING OR ONION HOES—2-prong, 25c, 1-prong.. 22c					
SCREEN DOORS—Dark finish; size 2.6 x 6.6; regularly \$1.25, at..... 95c					
STEEL RAKES—14-tooth, 48c; 12-tooth, 45c; 10-tooth 40c					
HEDGE SHEARS—10-in., \$1.35; 8-in..... 95c					
PRUNING SHEARS—Up from..... 15c					
GARDEN TROWELS—From 4c up to..... 45c					
TOILET PAPER—Special, 15 rolls for..... 25c					
STEPLADDERS—5 ft.; extra strong; at..... 45c					
SCREENS—Close to 21 in., extend to 33 in.; are 18 in. high; regularly 30c, at..... 25c					
SCREENS—24 in. high; extend to 37 in. and close to 23 in.; at..... 35c					
SCREENS—24 in. high; extend to 33 in., close to 21 in.; at..... 30c					
SPADES and round-point SHOVELS—Special at..... 55c					

Where is the Hardware merchant who cannot meet or better the prices quoted?

The fact of the matter is the retail Hardwareman cannot only meet these prices, but he can improve the general appearance of the advertisement. Cleaner and more effective cuts can be employed, which may be obtained at small expense from *The Iron Age* and other sources.

An advertising space of the size mentioned can be ob-

tained in any one of hundreds of local papers at an outlay of from \$1 to \$2. In cities of considerable size it could be published at from \$5 to \$10.

Very likely one insertion of such an advertisement would not pay in direct results. It is very rarely profitable to publish one insertion of *any* advertisement, but the frequent appearance of good, clean advertising, carefully prepared and well set up, is bound to go a long way toward keeping local money at home.

White Goods Sale Window Display.

A Dry Goods Store Idea Applied to Hardware.

BY F. B. M.

WHITE GOODS sales have heretofore been confined to dry goods stores, but it occurs to me that with a plentiful stock of white enameled ware, such as Coffee Pots, Saucepans, Dishpans, &c., together with other articles that may suggest themselves, the White Goods Sale can readily be brought within the realm of Hardware. As such sales by dry goods stores are generally advertised in the papers as "White Sales," the word goods being omitted, Hardware merchants can startle the public by advertising White Sales.

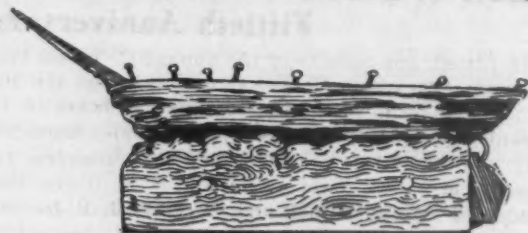
Boat in the Window.

To add to the attractiveness of the window display a large sailboat may be placed in the window, the hull being of white Sash Cord and the sails of different sized Lamp Wicks placed side by side and pinned together. The boat may be constructed as follows:

Take a piece of soft pine plank 2 in. thick, 6 in. wide and 3 ft. long. Bore a $\frac{3}{4}$ -in. hole in same for the mast, which can be made out of an old sawed off Broom handle, or any other piece of wood worked down to almost a point at the top. Place this in the hole; the mast should be about 14 in. high. Take another piece of wood and bevel off the under side and point the opposite end and nail down in front of the mast so that it slants upward according to the bevel, so that it will project out from the bow of the boat, when finished, for a bowsprit.

The Booms for the Spanker Sail

can be made out of $\frac{1}{4}$ -in. strips of wood rounded and whittled with a Penknife down to almost a point at their outer ends, the inner end being left full size, and a Screweye inserted that will just swing around and encircle the mast; the lower boom, being much longer than the upper and fitting on the mast only a little above the top of the hull of the vessel, is provided with a much larger Screweye than will be necessary for the upper



The White Sale Boat.

boom, as the mast becomes quite small in diameter at the point from which the upper one should be located. These booms carry the mainsail of Lamp Wicks and extend outward and backward over the vessel, and are connected with white Twine, Screweyes being first twisted into the Lamp Wicks at intervals, in lieu of Rings, for holding the sail to the mast.

The Braces for the Hull

are formed by driving 6-in. spikes into the planking at proper intervals in such a manner as to form the skeleton work of a perfectly shaped vessel. After the spikes have been driven, those at both the bow and stern can afterward be sent over by hammering until they assume grace-

ful curves and the proper shape, while those along the side can be curved outward and upward. Finish by tacking one end of some white sash cord to the blanking in the back at the bottom of the boat, and then starting and winding the cord on the outside of the nails or spikes, going around and around, working from the bottom up, encircling same, until the last wrapping of sash cord will just fit under the head of the spikes.

The final stop should be made in the back, and the cord pulled tightly and carefully tied to a supplemental nail which cannot be seen from the front. Any possible danger of the sash cord slipping down can be avoided by tying each round of sash cord with fine white twine to the stern nail only and notching the under side of the bowsprit where the cord comes. Make a jib sail out of wick, adding suitable guy ropes to the mast and sails. Surmount the mast with a tiny American flag, and just below and suspended from the outer end of the upper spanker boom sail have a white ribbon streamer lettered with the word Hardware.

The Finishing Touch.

Finish by taking a hatchet and chopping away at the outer edges of the top of the plank surrounding the boat. Chop any old way, the rougher the wood is left the better, only take care not to damage the boat while so doing. Complete by taking some green paint properly mixed with a somewhat blueish tinge and paint the plank in imitation of water, the rough hewn wood adding materially to the effect. After the green paint is perfectly dry take white paint and a smaller brush and touch all the high places with just a little daub of white here and there scattered over the uneven surface in imitation of foam or spray.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of new catalogues, price-lists, &c., for our Catalogue Department, and for notice in this column.

IMPERIAL MOTOR COMPANY, Grove City, Pa.: Circular illustrating and describing the Imperial Gearless Water Motor Washing Machine.

BUSHNELL TANK WORKS, Bushnell, Ill.: Booklet relating to Tanks, including Wooden, Steel, Watering, Thresher, Wagon and Dipping; also Tank Heaters, Steel Grain Bins, Feed Cookers, Stock Fountains, Pneumatic Tanks for Residence Water Supply, Silos, Ladders, Lawn Swings, Combination Fence and Rural Free Delivery Mail Boxes.

CHARLES H. BESLY & Co., 15-21 South Clinton street, Chicago, Ill.: Circular illustrating Besly Disk Grinders.

WALLACE BARNES COMPANY, Bristol, Conn.: Catalogue No. 5, largely devoted to small Springs of every description. Attention is directed to Hardened and Tempered Washers, which the company has made for years, but is now specializing and furnishing from 3-16 in. in diameter, .010 thick, to 3 in. in diameter, .125 thick. The company makes not only Flat Washers, but Cupped Washers, and Washers with flanged sides; also special Screw machine products up to $\frac{3}{8}$ in. in diameter.

HEYWOOD BROTHERS & WAKEFIELD COMPANY, Gardner, Mass.: Catalogue of 192 pages, illustrating an extensive and varied line of Baby Carriages and Go Carts; also Parasols for them.

TOLEDO METAL WHEEL COMPANY, Toledo, Ohio; Catalogues devoted to Steel Sleds, Steering Coasters, Steel Express Wagons, Push Carts, Velocipedes, Tricycles, Toy Barrows, Patrol Wagons, Sulkies, Juvenile Automobiles, Hand Autos, Hand Cars, &c.

S. B. HICKS & SONS COMPANY, Aberdeen, Wash., handling Heavy Hardware, iron and steel, Belting, Wire Rope, &c., is about to erect a new concrete business block with a frontage of 50 ft. and depth of 100 ft., with floor space of 9168 sq. ft., to be ready for occupancy by August 1. New lines will be added, including Brass Goods and Fittings.



Keep On

If the day looks kinder gloomy
 An' yer chances kinder slim,
 If the situation's puzzlin'
 An' the prospect's awful grim,
 An' perplexities keep pressin'
 Till all hope is nearly gone—
 Just bristle up an' grit ye teeth
 An' keep on keepin' o.n.

Well Directed Energy.

There are some men whose failure to succeed in life is a problem to others as well as themselves. They are industrious, prudent and economical; yet, after a long life of striving, old age finds them still poor. They complain of ill luck. They say fate is always against them. But the fact is they miscarry because they have mistaken mere activity for energy. Confounding two things essentially different, they have supposed that if they were always busy they would be certain to be advancing their fortunes. They have forgotten that misdirected labor is but a waste of activity. The person who would succeed in life is like a marksman firing at a target; if his shots miss the mark they are a waste of powder; to be of any service at all they must tell in the bull's-eye or near. So in the great game of life, what a man does must be made to count or it had almost as well been left undone. The idle warrior, cut from a shingle, who fights the air on the top of a weathercock, instead of being made to turn some machine commensurate with his strength, is not more worthless than the merely active man who, though busy from sunrise to sunset, dissipates his labor on trifles when he ought skillfully to concentrate it on some great end.

Everybody knows some one in his circle of acquaintance who, though always active, has this want of energy. The distemper, if we call it such, exhibits itself in various ways. In some cases the man has merely an executive faculty when he should have a directive one; in other language, he makes a capital clerk for himself when he ought to do the thinking of the business. In other cases what is done is either not done at the right time or in the right way. Sometimes there is no distinction made between objects of different magnitudes, but as much labor is bestowed on a trivial affair as on

a matter of vast moment. Energy, correctly understood, is activity proportioned to the end. Napoleon would often when on a campaign remain for days without taking

off his clothes, now galloping from point to point, now dictating dispatches, now studying maps. But his periods of repose when the crisis was over were generally as protracted as his exertions had been. He has been known to sleep for 18 hr. on a stretch. Second rate men, your slaves of tape and routine, while they would fall short of the superhuman exertions of the great Emperor, would have thought themselves lost beyond hope if they imitated what they call his indolence. They are capital illustrations of activity, keeping up their monotonous jog-trot forever, while Napoleon with his gigantic industry alternating with such apparent idleness is as striking an example of energy.

We do not mean to imply that chronic indolence, if relieved occasionally by spasmodic fits of industry, is to be recommended. Men who have this character run into the opposite extreme of that which we have been

stigmatizing and fail as invariably of winning success in life. To call their occasional periods of application energy would be a sad misnomer. Such persons, indeed, are but civilized savages, so to speak, vagabonds at heart in their secret hatred of work, and only

Civilized Savages. resorting to labor occasionally, like the wild Indian, who after lying for weeks about his hut is roused by sheer hunger and starts off on a hunting excursion. Real energy is persevering, steady, disciplined. It never either loses sight of the object to be accomplished nor intermits its exertions while there is a possibility of success. Napoleon in the plains of Champagne, sometimes fighting two battles in one day, first defeating the Russians and then turning on the Austrians, is an illustration of this energy. The Duke of Brunswick dawdling away precious time when he invaded France at the outbreak of the first revolution is an example to the contrary. Activity beats about a cover like an untrained dog, never lighting on the covey. Energy goes straight to the bird.—Freeman Hunt.

Maxims from Bacon.

In the choice of instruments, it is better to choose men of a plainer sort that are like to do what is committed to them, and to report back again faithfully the success than those who are cunning to contrive out of other men's business somewhat to grace themselves, and will help the matter in report for satisfaction sake.

Also use such persons as affect [or take pleasure in] the business wherein they are employed; for that quickeneth much; and such as are fit for the matter—as bold men for expostulation, fair-spoken men for persuasion, crafty men for inquiry and observation.

Use also such as have been lucky and prevailed before in things wherein you have employed them; for that breeds confidence, and they will strive to maintain this precedent.

Turning Points.

History is full of incidents which show upon what little things careers have turned. And where one such incident is known there are thousands that are unknown. A man is impressed by a lad's polished shoes, makes inquiries which leads to his employment, and the boy becomes a captain of industry. A cheerful smile wins a friend, who introduces us to a circle of helpful men and women, whose ideas raise our standards and influence our lives. Even the simplest little acts of courtesy and kindness have been known to open broad channels for good.

Samuel C. Tatum Company's Fiftieth Anniversary.

THE fiftieth anniversary of the Samuel C. Tatum Company, Cincinnati, Ohio, was celebrated on the 10th inst., in the form of a reception and at home in the company's new plant, on Colerain avenue and Monmouth street, one of the best appointed and most complete factories in the Middle West. President S. E. Hilles, Vice-President W. S. Mendenhall and Secretary J. T. Jemison, aided by the office force and superintendents, treated the several hundred visitors royally, beginning with a tour through the capacious plant and winding up with a handsome luncheon and souvenirs of the occasion.

The plant comprises a main building, 262 x 55 ft., four stories and basement; a foundry building, 105 x 300 ft., and other smaller structures, the whole making a large quadrangle. The construction is largely of steel, with iron spot brick for the exterior walls, and the plant is fitted throughout with an automatic sprinkler system. A beautiful lawn in front forms a fitting balance for the natural and architectural beauty of the park and buildings of the Cincinnati House of Refuge opposite.

The company's products, which in 1877 and for several years afterward, consisted of Letter Copying Presses, in addition to gray iron Castings, the original business

of the founder, Samuel C. Tatum, have been enlarged gradually until now complete departments devoted to the manufacture of many Hardware specialties and office novelties, especially loose leaf devices, are maintained. Another important line is Tatum's Adjustable Paper Punches, for punching paper of every kind for every purpose.

The Acme Steel Goods Company.

The Acme Steel Goods Company, Chicago, Ill., manufacturer of steel and wire goods, with warehouses also in New York City and Atlanta, Ga., has lately commenced the manufacture of light and heavy strap and light and extra heavy T-hinges and wrought hasps and staples.

Union Steel Screen Company.

The Union Steel Screen Company, Albion, Mich., has taken up the manufacture of several new lines, including oven and refrigerator shelves, wire goods, especially guards for electric fans, &c., and woven wire, the woven wire department, including looms, of the Detroit Wire & Iron Works, Detroit, Mich., having lately been purchased. With these additions the company is now manufacturing the following lines: Oven racks, refrigerator shelves, brass fan guards for electric fans, steel shelves of all kinds, woven wire cloth, sand and coal screens, grates, hardware display racks, elevator enclosures and a large line of special wire and iron work.

The American Galvanized Cistern Tank.

Among other forms of steel tanks made by the Kelly Mfg. Company, Waterloo, Iowa, is the American galvanized cistern tank. The tank is designed for use either above or below ground and when buried makes a sanitary cistern, since surface water cannot leak through. It is built in segments, with reinforcing bands on the outside and inside, the latter being made of galvanized angles or channels to stiffen it against collapse when the cistern is empty. All of the metal parts entering into the construction of the cistern are galvanized. It is made in 15 sizes, ranging in capacity from 12 to 180 barrels, and in weight from 176 to 1000 lb. Prices and weights are based on the use of No. 20 galvanized steel, but for the larger sizes heavier gauges are recommended. Nos. 1009 to 1014, running from 6 ft. in diameter by 6 ft. high to 10 x 10 ft., are always shipped knocked down unless otherwise specified.

The Fearless Dishwasher.

The Fearless Dishwasher Company, 175-179 Colvin street, Rochester, N. Y., is manufacturing dishwashers of galvanized iron or 48-oz. cold rolled copper. In operation the wire basket with dishes is lowered into a cradle, and with the aid of a lever handle given a few movements back and forth, which cleanses the dishes. A low down 16-in. lift places the basket in the hot rinse, and another lift on the assorting table. Machines are furnished to be heated by steam, natural or artificial gas. There is also a power machine, which combines the advantages of the hand machine and requires less labor. During the past year improvements have been made, including a sloped bottom, so that water will instantly flow out by opening the outlet, and there is a new outlet and overflow system. The company furnish tables of hard maple, used in connection with its dishwashers, for assorting and scraping dishes. These are made in various shapes and sizes to suit different locations. The company's scraping block and ring are designed for scraping dishes in connection with scraping tables.

The Prisco Tiger Brand Oil Cans.

The Pritchard-Strong Company, Rochester, N. Y., is offering Tiger Brand oil cans, which, while being sold at a medium price, still maintain the standard of other Prisco products. The heavy wire bail, with enameled wood handle, is attached to the side of can through

openings, reinforced with brass eyelets to prevent bail pulling out. The breast is double seamed to the body, and with a deep channel to receive drip. The screw caps



The Prisco Tiger Brand Oil Cans with Breast Double Seamed to Body and with Deep Channel to Receive Drip.

are high with cork inserts and chain attachments. The brass faucets are of the positive action compression type. The body is made of extra heavy aluminized-galvanized sheets of brilliant appearance, and is double seamed to the body the same as the breast, being raised from the floor to increase the life of the can. The can shown represents the 3-gal. oil faucet style. This type is also made for 5 gal., with faucet, and for 5 gal. to lay down, having faucet in breast. One, 2, 3 and 5 gal. cans, with spout in breast, complete the line for oil. A 3-gal. spout can and 5-gal. faucet can are made for gasoline.

Pike's Scientific Lawn Mower Sharpener.

The accompanying illustrations are of a lawn mower sharpener put on the market by Pike Mfg. Company, Pike, N. H., and 151 Chambers street, New York. The sharpener, shown in Fig. 1, consists of a heavy coat of emery on a stout piece of wood that is attached to a lawn mower by means of castings and bolts, as shown in Fig. 2, and capable of adjustment, so that there may be perfect contact between the revolving knives and the



Fig. 1.—Pike's Scientific Lawn Mower Sharpener, Held Firmly in Place Against the Bed Plate of Mower, and Adjusted by Two Thumbscrews.

emery sharpener, as illustrated in Fig. 3. After the sharpener is in place the mower is pushed along the floor, sidewalk of any smooth place, as in cutting grass, the knives thus being revolved until the desired sharp-



Fig. 2.—Pike's Lawn Mower Sharpener in Position on the Mower.

ening has been accomplished, and the knives made even, so that there is perfect contact between the bed plate and revolving knives the entire length. The sharpener is supplied in different lengths to fit different widths of lawn mowers, may be quickly attached to any modern

mower and is easily and quickly adjusted. The sharpeners are packed half dozen in a pasteboard carton, $\frac{1}{4}$

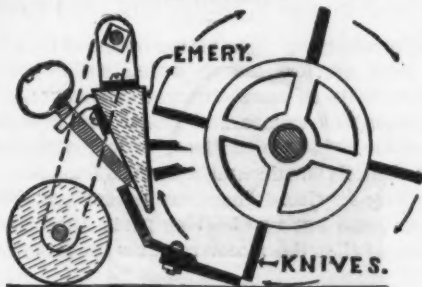


Fig. 3.—End View of Pike's Lawn Mower Sharpener in Position and Demonstration of Grinding Process.

gross in a case, and are supplied in all sizes per inch for 12 to 20 in. knives.

Collmer's Emery Wheel Dresser Cutter.

The illustration here shown relates to a new cutter for dressing emery wheels recently developed and now being offered by Collmer Brothers, South Bend, Ind. The cutter is composed of cold pressed fluted steel disks, which are said to have remarkable wearing qualities. The disks are securely bound together by face collars with flanged arms, which extend through slotted openings in the disks and are clinched by pressure. The wheels are made to fit any Huntington handle and, being of wrought steel, cannot be readily broken.



Collmer's Emery Wheel Dresser Cutter Composed of Cold Pressed Fluted Steel Disks.

Star Air Pump.

W. & J. Tiebout, 118 Chambers street, New York, manufacturers and handlers of marine hardware, have put on the market the Star air pump. It is designed to satisfy a demand for a reliable pump at a moderate price, and may be used for innumerable purposes where compressed air is required, as, for example, the charging of storage tanks, blowing whistles, inflating pneumatic tires, and the like. It requires but $3\frac{1}{2}$ in. space on a propeller shaft, and is 10 in. long. It may be put on either side of a shaft, is compact, strong and simple, takes but little power for operation, and a whistle may be blown 30 sec. after starting the engine. It will pump a 10-gal. tank up to 60 lb. pressure with 400 revolutions in about 10 min., it is claimed, and among the advantages ascribed to it are that there are no foul smelling gases from burnt oil or gas from cylinders when whistle is blown, and there is nothing but air pumped into the tank. It can be attached to any size of shaft by detaching shaft from engine, slipping on cam and pump arms, or the pump will be furnished with split cam and hinged boxes on pump arms for quick installation without detaching shaft from engine. When sufficient air has been pumped into the tank by shifting

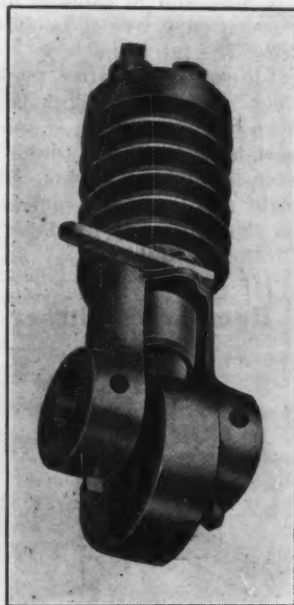


Fig. 1.—Star Air Pump.

the lever the piston is held back, thereby leaving the cam to revolve without coming in contact with the pump piston, thus preventing needless wear and friction. There is no increase of pressure after about 60 lb., and as all tanks are tested to 100 lb. the possibility of bursting the tank is avoided. Pumps are regularly stocked for eight



Fig. 2.—Showing Relation of Pump to Shaft and Various Appurtenances.

diameters of shafts $\frac{5}{8}$ to $1\frac{1}{2}$ in., inclusive, by $\frac{1}{8}$ in., any size being obtainable at a special price. Fig. 1 illustrates the pump proper, Fig. 2 representing the relation of pump to power supply, together with the method of arranging the various accessories. The pump is sold separately, or in combination with outfits—one of which, outfit A, includes two $\frac{1}{4}$ -in. brass unions, 6 ft. lead pipe, $\frac{1}{4}$ in. with brass nipples, 10 ft. of same kind of lead pipe, one 12 x 20 in. galvanized tank, one brass gauge, one brass whistle with stuffing box, one brass air whistle, No. 1, 2 or 5, one check valve, together with necessary nipples, ells and tees.

The Improved Rev-o-noc Washing Machine.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., are offering the improved Rev-o-noc washing machine. It has two sockets to receive the handle, permitting the operator to work at the side or top, whichever is the most convenient, with equally good results. One thrust of the handle makes a three-quarter revolution of the dasher and back and turns the flywheel seven times. This gives sufficient momentum, it is remarked, to operate the dasher three times without further exertion.



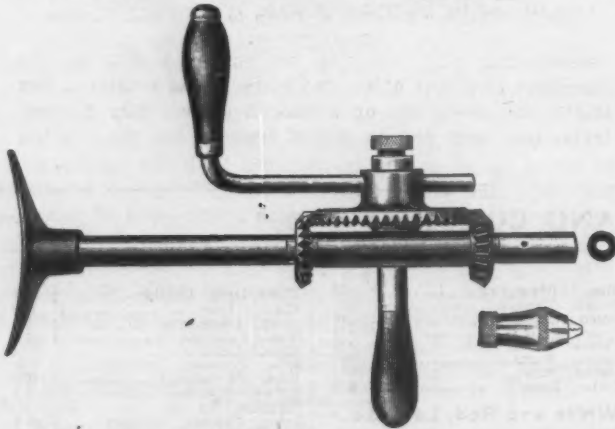
The Improved Rev-o-noc Washing Machine, Rotary Motion Without Turning a Crank; High Speed with Comparatively Little Effort; Continuous Motion Without Constant Exertion.

No effort is required on the handle in the return to position, thus relieving the individual of constant effort. It is stated that the machine will wash soiled clothing clean in 3 or 4 min., that the washing is done by the action of the water on and through the contents of the

tub, and consequently there is little wear on the clothes. The washer is built substantially, with an extra heavy tub of clear red Louisiana cypress, legs are cross braced and rigid, the top made double to prevent warping and the few metal parts are simple, strong and not liable to get out of order.

The Lancaster Breast Drill No. 50.

The Lancaster Machine & Knife Works, Lancaster, N. Y., is putting on the market the Lancaster breast drill. A special feature is in holding the drill with an oval taper form chuck and shank, which is lathe turned to make a true fit and insure perfect work. The advantages of this method of holding the drill, it is explained, lie in a positive drive, extreme simplicity, absence of



The Lancaster Breast Drill No. 50 with Oval Taper Form Chuck and Shank.

wear and greater capacity for work. The oval shank drills are made for this company by the Whitman & Barnes Mfg. Company, and it is the intention to furnish them with the breast drills or singly, as desired. The stock has a two-jaw chuck with forged alligator jaws. Portions of the tool are nicked and the rest painted red.

A Steel Stool With Back Rest No. 102.



A Steel Stool with Back Rest, and Hardwood Seat Set in an Electrically Welded Steel Band.

The Kalamazoo Steel Goods Company, Kalamazoo, Mich., has added to its line of steel stools and chairs the style No. 102. It is designed for factory and office use and is fitted with a comfortable back rest. In other respects the construction is the same as No. 2 style, without back, having a hardwood seat 13 in. in diameter by 1 1/4 in. thick, set in an electrically welded steel band. The legs are of three-quarter in. angle steel, with flat steel braces, reinforced by a center ring. The stool is made in six heights, ranging from 20 to 30 in., and is finished in baked maroon enamel.

In an illustrated description of the hand and foot power grinders of the El Starr Mfg. Company, Milwaukee, Wis., in a recent issue one of the illustrations was inadvertently described as of the two-wheel type Godfrey grinder. This, however, was the company's Hercules grinder, which is especially designed for the use of contractors, railroads, plantations and all shops having heavy grinding to do. The regular attachments consist of exceptionally large rests which are adjustable for chisel and all kinds of tools, the twist drill attachment being particularly adapted to the work the machine is expected to do. The grinder measures 18 in. in height and carries two wheels 6 x 1 1/4 x 1 in.

The Bossco Gearless Motor Washing Machine.

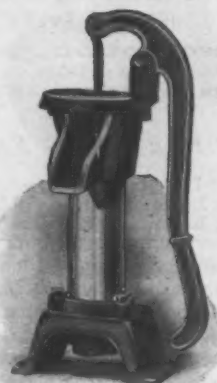
The accompanying illustration represents a washing machine with gearless motor, which will work successfully under 30 lb. or more city water pressure. The motor is of phosphor bronze and brass, and is constructed on the turbine principle of direct action, with few working parts, heavily made and accurately machined so as to insure long service. There are no springs used in its construction, and but two bearing parts, these being self-lubricating, so that the motor requires no attention while



The Bossco Gearless Motor Washing Machine. — Motor Constructed on the Turbine Principle of Direct Action and Operated by Ordinary City Water Pressure.

in use. It is fastened to a solid one-piece base to hold it rigid at all times and minimize wear. The motor is self-draining to prevent damage by freezing. The inlet and outlet hose are extra long, of the best quality, and the outlet hose has weight attached to hold it in waste basin or sink. The motor has no working parts exposed, avoiding accidents to children and adults. The tub and all wooden parts are of Louisiana red cypress, natural finish. The tub has a large steam tight lid and reinforced set-in head, the latter to prevent drippings soiling the floor. The dasher block is corrugated on under side to keep it from warping or splitting. The telescopic dasher post is designed to prevent the tangling and tearing of even the finest garments. The capacity of the washer is eight shirts or their equivalent, and the machine is put on the market by the Boss Washing Machine Company, Cincinnati, Ohio.

Humphryes Pitcher Spout Pump H 356.



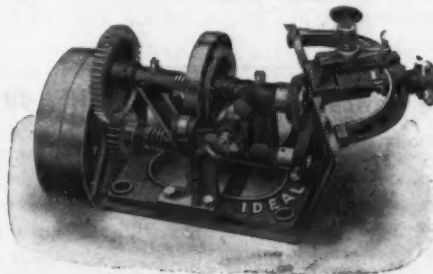
The Humphryes Pitcher Spout Pump H 356.

The pitcher spout pump shown herewith has recently been added to the line of the Humphryes Mfg. Company, Mansfield, Ohio. The pump is provided with a seamless drawn brass cylinder, which is both serviceable and attractive. Attention is directed by the manufacturer to the design and construction as creditable where a neat, compact pump, in keeping with pretentious surroundings, is required.

The Ideal Automatic Band Saw Sharpener, 1909 Model.

The Ideal band saw sharpener, manufactured by the Rotary File & Machine Company, 589 Kent avenue, Brooklyn, N. Y., may be used either on a bench or pedestal, and automatically files small band saws, ranging in size up to and including saws with teeth $\frac{1}{2}$ in. from tooth point to tooth point and $1\frac{1}{4}$ in. width of blade. The vise that carries the saw is clamped by spring pressure sufficient to grip the saw firmly, yet allowing it to be slipped through as each tooth is filed. At each revolution of the file shaft the file is automatically withdrawn from engagement with a tooth, dropped back, and just as the smooth portion of its circumference reaches the saw, it pushes the saw along for the next tooth. The length of movement is regulated by a thumbscrew, according to the size of the saw tooth. The file is controlled by cams so as to cut only a certain depth each time, this feature insuring accurate and even teeth. The construction of the vise, it is explained, permits a thick weld, and, in fact, almost anything but a break to pass

through the vise without stopping the machine or injuring a tooth. The company states that the machine will accomplish a given amount of work in a quarter or less time required for hand filing, because it is automatic,



The Ideal Automatic Band Saw Sharpener, Capable of Filing Small Band Saws with Teeth Up to $\frac{1}{2}$ In. from Point to Point and $1\frac{1}{4}$ In. Width of Blade.

necessitating only inserting the saw and starting the machine; also that a boy can place the saw after a few trials. The point is emphasized that the rotary file outlasts three saw files by actual test.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—	
	gal.
Linsced, Western, Raw.....	60 @61
State, Raw.....	60 @61
City, Raw.....	61 @62
Boiled, 1¢ gal. advance on Raw.	
Raw, Calcutta, in bbls.....	75 @
Lard, Prime Winter.....	88 @
Extra No. 1.....	57 @58
No. 1.....	48 @50
Cotton-seed, Crude, f.o.b. mill.....	1.67@4.73
Summer, Yellow, prime.....	5.80@6.22
Summer, White.....	6.10@6.20
Yellow, Winter.....	6.15@6.20
Tallow, Acidless.....	56 @
Menhaden, Brown, Strained.....	33 @34
Northern, Crude.....	@
Southern.....	24 @25
Light Strained.....	33 @34
Bleached Winter.....	36 @
Extra Bleached Winter.....	38 @
Cocunut, Ceylon.....	7.20@
Cochin.....	7.40@
Cod, Domestic, Prime.....	38 @
Newfoundland.....	40 @
Red Elaine.....	43 @47
Saponified.....	5¢ @ 5¢ @ 6¢
Olive, Yellow.....	1.40@1.50
Neatsfoot, Prime.....	55 @56
Palm, Lagos.....	5.55@5.60
Mineral Oils—	
	gal.
Black, 29 gravity, 25@30 cold test.....	12¢ @13
29 gravity, 15 cold test.....	13¢ @13 1/4
Summer.....	12 @12 1/4
Cylinder, light filtered.....	20 @20 1/4
Dark, filtered.....	17¢ @18
Paraffine, 903-907 sp. gravity.....	14 @14 1/4
903 sp. gravity.....	13 @13 1/4
883 sp. gravity.....	10¢ @11
Red.....	13 @13 1/4
Miscellaneous—	
Rarities:	
White, Foreign.....	ton \$18.50@20.50
Amer. floated.....	ton 17.00@18.00
Off color.....	ton 12.50@15.00
Chalk in bulk.....	ton 3.00@ 3.40

China Clay, Imported.....	
	gal.
Cobalt, Oxide.....	100 lb 1.45@2.60
Whiting, Commercial.....	100 lb 45@60
Gilders.....	100 lb 52@64
Ex. Gilders.....	100 lb 56@68
Putty, Commercial—	
	100 lb
In bladders.....	\$1.70@2.00
In bbls. or tubs, 100 lb.....	1.20@1.45
In 1 lb to 5 lb tins.....	2.65@3.25
In 12 1/2 to 50 lb tins.....	1.50@1.90
Spirits Turpentine—	
	gal.
In Oil bbls.....	42 @43 1/4
In Machine bbls.....	43 1/4 @44
Glue—	
	lb
Cabinet.....	12 @15
Common Bone.....	7 1/2 @ 9
Extra White.....	18 @24
Fish, liquid, 50 gal. bbls., per gal.....	1.20
Foot Stock, White.....	12 @14
Foot Stock, Brown.....	9 @11
German Common Hide.....	10 @12
German Hide.....	12 @18
French.....	10 @40
Irish.....	13 @16
Low Grade.....	10 @12
Medium White.....	14 @19
Gum Shellac—	
	lb
Bleached, Commercial.....	16 @16 1/4
Bone Dry.....	20 @21
Button.....	20 @30
Diamond I.....	27 @28
Fine Orange.....	20 @21
A. C. Garnet.....	15 1/4 @16
Light Orange.....	17 @19
Kala Button.....	10 @11
D. C.....	27 @28
Cetagon B.....	22 @23
T. N.....	14 @15
V. S. O.....	25 @26
Colors in Oil—	
	lb
Black, Lampblack.....	12 @14
Blue, Chinese.....	36 @46
Blue, Prussian.....	32 @36

Blue, Ultramarine.....	
	lb
Brown, Vandyke.....	11 @14
Green, Chrome.....	12 @16
Sienna, Paris.....	12 @24
Sienna, Burnt.....	12 @15
Umber, Raw.....	11 @14
Umber, Burnt.....	11 @14
White and Red, Lead &c.—	
	lb
Lead, English white, in Oil.....	10 1/4 @10 1/2
Lead, American White:	
Dry and in Oil, 100, 250 and 500 lb kegs.....	6%
Dry and in Oil, 25 and 50 lb kegs.....	7
Dry and in Oil, 12 1/2 lb kegs.....	7 1/4
In Oil, 25 lb tin pails.....	7 1/4
In Oil, 12 1/2 lb tin pails.....	7 1/4
In Oil, 1, 2, 3 and 5 lb tin cans, asst.....	8%
Red Lead and Litharge:	
In 100 lb kegs.....	7
In 25 and 50 lb kegs.....	7 1/4
In 12 1/2 lb kegs.....	7 1/4
In lots of less than 500 lbs.	7 1/2
1/4¢ @ 1/2¢ advance over above prices of White and Red Lead and Litharge.	
Lead, American. Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.	
Zinc, Dry—	
	lb
American, dry.....	5 1/4 @ 5%
Red Seal (French process).....	6% @ 7
Green Seal.....	7 1/4 @ 7 1/2
German Red Seal (French process).....	7 1/4 @ 7 1/2
Green Seal.....	7 1/4 @ 8
White Seal.....	8% @ 9
French, Red Seal.....	8% @ 8 1/2
Green Seal.....	10% @ 10 1/2
Dry Colors—	
	lb
Black, Carbon.....	7 @10
Black Drop, American.....	3 1/4 @ 8

Black Drop, English.....	
	5 @15
Black, Ivory.....	16 @20
Lamp, commercial.....	3 @ 5
Blue, Celestial.....	4 @ 6
Blue, Chinese.....	30 @31
Blue, Prussian, Domestic.....	28 @30
Blue, Ultramarine.....	5 @15
Brown, Spanish.....	1/2 @ 1
Carmine, No. 40.....	\$2.75@2.85
Green, Chrome, ordinary.....	3 1/2 @ 5
Green, Chrome, pure.....	17 @25
Metallic Paint, Brown.....	
	ton
ton.....	\$16.50@22.00
Red.....	ton \$14.00@18.00
Ocher, American.....	ton \$12.00@15.00
American Golden.....	4 @ 5
French.....	14 @ 2
Foreign Golden.....	3 @ 4
Orange Mineral, English.....	10 @12
French.....	12 1/2 @13
German.....	12 @13
American.....	8 1/2 @10
Red, Indian, English.....	5 @ 7
American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @10
Red, Tuscan, English.....	7 @10
Red, Venetian, Amer.....	100 lb \$0.75@1.50
English.....	100 lb \$1.15@1.60
Sienna, Italian, Burnt and Powdered.....	3 @ 9
Italian, Raw, Powdered.....	3 @ 7
American, Raw.....	24 @ 3
American Burnt and Pow'd.....	24 @ 3
Talc, French.....	ton \$18.00@25.00
American.....	ton 15.00@25.00
Terra Alba, French.....	100 lb .80@1.00
English.....	100 lb .90@1.00
American.....	100 lb .75@.80
American.....	100 lb No. 2, .60@.65
Umber, Tkey, Bnt. & Pow'd.....	24 @ 3
Turkey, Raw and Powdered.....	24 @ 3
Burnt, American.....	2 @ 2 1/4
Raw, American.....	2 @ 2 1/4
Yellow Chrome.....	12 1/2 @13
Oxide Red, American.....	2 @ 7 1/4
Vermilion, English, Imported.....	@70
Chinese.....	\$0.90@1.00

THE IRON AGE

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Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33 1/2%
North's.....10%
Upon's Patent, 1/2 gro., \$29.90.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....10%
Ives' Stop Bead Screws and Washers.....10%
Taplin's Perfection.....10%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, 1/2 doz. pairs, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Anvils—American—

Eagle Anvils.....10%
Hay-Rhuden, Wrought.....10%
Treutlen.....10%

Imported—

Swedish Solid Steel Paragon.....10%
Swedish Solid Steel Sisco, Superior.....10%
Wright & Sons, 1/2 lb. 81 to 319 lb. 11c; 350 to 600 lb. 11 1/2c.

Anvil, Vice and Drill—

Millers Falls Co., \$18.00.....10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....10%

Augers and Bits—

Common Double Spur.....30%
Jennings' Patn., Bright.....10%
Black Lip or Blued.....10%
Boring Mach. Augers.....10%
Car Bits, 12-in. twist.....10%
Ford's Auger and Car Bits.....10%
Ft. Washington Auger Co., Concord's.....10%
Forster Pat. Auger Bits.....10%
C. E. Jennings & Co., No. 10 ext. lip, R. Jennings' list.....10%

Augers and Bits—

No. 30, R. Jennings' list.....10%
Russell Jennings' list.....10%
L'Hommedieu Car Bits.....10%
Mayhew's Countersink Bits.....10%
Pugh's Black.....10%
Pugh's Jennings' Pattern.....10%
Snell's Auger Bits.....10%
Snell's Bell Hanger Bits.....10%
Snell's Car Bits, 12-in. twist.....10%
Snell's King Auger Bits.....10%
Snell's Star Auger Bits.....10%
Swan's.....10%
Swan's Jennings' Pattern.....10%
Wright's Jennings' Bits.....10%

Bit Stock Drills—

Expansive Bits—

Clark's Pattern, No. 1, 1/2 doz., \$28; No. 2, \$18.....10%
Ford's, Clark's Pattern.....10%
C. E. Jennings & Co., Steer's Pat. 25; Lavigne Pat., small size, \$18.00; large size, \$26.00.....10%
Swan's.....10%

Gimlet Bits—

Common Dbl. Cut.....\$3.00@3.25
German Pattern, Nos. 1 to 10, \$1.75; 11 to 13, \$3.75

Hollow Augers—

Bonney Pat., per doz.....\$5.50@6.00
Ames.....10%
Universal.....10%

Ship Augers and Bits—

Ship Augers.....10%
Ford's.....10%
C. E. Jennings & Co., L'Hommedieu's.....10%
Watrous'.....10%
Snell's.....10%

Awl Hatts—See Handles, Mechanics' Tool.

Awls—

Hand Awls.....10%
Unhanded, Skiddered.....10%
Unhanded, Patent.....10%

Peg Awls—

Unhanded, Patent.....10%
Unhanded, Skiddered.....10%

Scratch Awls—

Handled, Com.....10%
Handled, Rocket.....10%
Tompson and Brad Awls.....10%
Scratch Awls.....10%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$4.75@5.00
Second Quality.....\$4.25@4.50

Double Bit, base weights:—

First Quality.....\$7.00@7.50
Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle.

Axles—

Iron or Steel.

Concord, Loose Collar.....

Concord, Solid Collar.....10%
No. 1 Common, Loose.....10%
No. 1 1/2 Com., New Style.....10%
No. 2 Solid Collar.....10%

Half Patent.....

Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18.....70%
Nos. 19 to 22.....70%

Boxes, Axles—

Common and Concord, not turned.....10%
Common and Concord, turned.....10%

Half Patent.....

lb. 6@7c
lb. 9@10c

Bait—

Fishing—

Hendrix.....20%
Bait.....20%
Competitor Bait.....20%

Balances—

Sash.....10%
Caldwell new list.....10%
Pullman.....10%

Spring—

Light Spring Balances.....10%
Chattillon's.....10%

Light Spg. Balances.....10%
Straight Balances.....10%
Circular Balances.....10%
Large Dial.....10%

Barb Wire—See Wire, Barb.

Bars—

Steel Crowbars, 10 to 40 lb. per lb., 2 1/2@2 1/2c

Towel—

No. 10 Ideal, Nickel Plate.....10%

Beam, Scale—

Scale Beams.....10%
Chattillon's No. 1.....10%
Chattillon's No. 2.....10%

Beaters, Carpet—

Holt-Lyon Co., No. 12 Wire Coppered 1/2 doz. \$9.80; Tinned.....\$9.80
No. 11 Wire Coppered 1/2 doz. \$1.15; Tinned.....\$1.15
No. 10 Wire Tinned.....1/2 doz. \$1.50

Beaters Egg—

Dover Stamping & Mfg. Co., Genuine Dover, per gro., No. 1, Tumbler Size, \$7.50; No. 2, Family Size, \$7.50; No. 3, Extra Family Size, \$24.00; No. 4, Hotel Size, \$30.00.

Holt-Lyon Co.,

Holt, per doz., No. 5, Jap'd. \$9.80; No. A, Jap'd. \$1.15; No. B, Jap'd. \$1.85; No. 6, Jap'd. \$1.65; Lyon, Jap'd, per doz., No. 2, \$1.35.

Taplin Mfg. Co.,

Improved Dover, per gro., No. 60, \$4.00; No. 75, \$6.50; No. 100, \$7.00; No. 102, Tin'd. \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd. \$17.00; No. 200, Tumbler, \$3.50; No. 202, Tumbler Tin'd. \$3.50; No. 300, Mammoth, per doz. \$23.00.

Bellows—

Blacksmith Standard List:

Split Leather.....10%
Grain Leather.....10%

Hand—

Inch.....10%
Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—

Inch.....10%
Doz. \$7.50 9.00 12.00 15.00

Bells—

Handled, Cow.....10%
Handled, Cow Bells.....10%

Jersey

Texas Star.....10%

Door—

Home, R. & E. Mfg. Co.'s.....10%

Hand—

Polished, Brass.....60@60 1/2@10%

White Metal.....60@60 1/2@10%

Nickel Plated.....50@10%

Strips.....50@10%

Cone's Globe Hand Bells.....33 1/2@35%

Miscellaneous—

Farm Bells.....10%
Church and School.....60@60 1/2@10%

Belting—

First Quality, Ex. Hy., Strictly Short Lap.....60@10%

Standard.....70@10@70 1/2@10 1/2@5%

Light Double.....75@10%

Cut Leather Lacing.....45@50%

Leather Lacing Sides, per sq. ft. 25c

Rubber—

Competition (Low Grade).....70@10@75%

Standard.....60@10@70%

Best Grades.....40@50%

Bench Stops—

See Stops, Bench

Benders and Upsetters,

Tire—

Green River Tire Benders and Upsetters.....20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1908 list: Chain, Parts, Spokes.....30%

Cages, Bird—

Henry's Brass: Series 3000, F000, 1100, net list; 1200, 15%; 200, 300, 500
Henry's Bronze: Series 700, 800, 900, 30%
Henry's Enamelled.....35%

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong, per 100 lb., \$3.50 @ \$3.85
Sharp, 1 prong, per 100 lb., \$4.00 @ \$4.35

Burke's, 1 pr. Blunt Toe, 3/4"; 2 pr. Blunt Toe, 4/4"; 1 pr. Sharp Toe, 4/4"; 2 pr. Sharp Toe, 4/4"; Blunt Heel, 4/4"; Sharp Heel, 4/4"; Lantier, Blunt, 4/4"; 3/4"; Sharp, 4/4"; Perkins, Blunt, 1 lb, 3/4"; Sharp, 4/4"; 4.15¢

Can Openers—

See Openers, Can.

Caps, Percussion—

Eley's E. B.....52¢ @ 55¢
F. D.....per M. \$1 @ 55¢
G. L.....per M. \$1 @ 42¢
G. E.....per M. \$1 @ 45¢
Musket.....per M. \$1 @ 63¢

Primers—

Berdan Primers, \$2 per M. 20¢ @ 5%
Primer Shells and Bullets, 15¢ @ 10%
All other primers per M. \$1.52 @ 1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
32 C. F., \$5.50.....10¢ @ 5%
38 C. F., \$7.00.....10¢ @ 5%
22 cal. Rim, \$1.50.....10¢ @ 5%
32 cal. Rim, \$2.75.....10¢ @ 5%
B. B. Caps, Con. Ball, Sigid, \$1.00
B. B. Caps, Round Ball.....\$1.10
Central Fire.....25¢
Target and Sporting Rifle, 15¢ @ 10%
Primer Shells and Bullets, 15¢ @ 10%
Rim Fire, Sporting.....50¢
Rim Fire, Military.....15¢ @ 5%

Casters—

Bed.....65¢ @ 70¢
Plate.....60¢ @ 65¢
Philadelphia.....70¢ @ 75¢
Acme, Ball Bearing.....70¢ @ 75¢
Gem (Roller Bearing).....70¢ @ 75¢
Steel Gem (Roller Bearing).....70¢
Standard Ball Bearing.....45¢
Yale (Double Wheel) low list.....40¢ @ 10%

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
3/16 3/4 5/16 3/4 1/2 5/8
\$7.45 4.80 3.85 3.25 3.10 3.00
3/4-1. 1 1/4 to 1 1/2 inch.
\$2.90 3.00
German Coil.....70¢ @ 5%
German Pattern Coil:
6-0 to 1.....70¢ @ 10¢ @ 5%
2 and 3.....60¢ @ 10¢ @ 70%
4, 5 and 6.....50¢ @ 10¢ @ 50¢ @ 10%

Halter—

Halter Chains.....60¢ @ 60¢ @ 10%
German Pattern Halter Chains,
list July 24, '07.....70¢ @ 5%
Covert Mfg. Co.:
Halter.....35¢ @ 5%

Cow Ties—

See Ties and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/4-6-3, Straight, with ring, \$26.00
6 1/4-6-2, Straight, with ring, \$27.00
6 1/4-8-2, Straight, with ring, \$30.00
6 1/4-10-2, Straight, with ring, \$35.00
NOTE.—Add 2¢ per pair for Hooks
Twist Traces: add per pair for Nos. 2
and 3, 2¢; No. 1, 3¢; No. 9, 4¢ to price of
Straight Link.
Eastern Standard Traces, Wag-
on Chain, &c.....70¢ @ 10% @ —%

Miscellaneous—

Jack Chain:
Iron.....60¢ @ 10¢ @ 50¢ @ 10¢ @ 10%
Brass.....65¢ @ 5%
Safety and Plumbers' Chain, 75¢
Gal. Pump Chain.....10¢ @ 4% @ 5%
Bridgeport Chain Co.:
Triumph Halter and Coll., 35¢ @ 40%
Triumph Dog.....40¢ @ 60%
Brown Halter and Coll.....50¢ @ 5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion.....40%
Oneida Community:
American Halter, Dog and Kennel
Chains.....35¢ @ 40%
Niagara Dog Leads and Kennel
Chains.....45¢ @ 50¢ @ 5%
Wire Goods Co.:
Dog Chain.....70%
Universal Dbl.-Jointed Chain.....70%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60%
Pullman:
Bronze Chain, 60%; Steel Chain,
Coppered.....60¢ @ 10%
Sash Chain Attachments, per set, 8¢
Aluminum Sash Ribbon, per 100
ft.....\$2.00 @ 35.00
Sash Ribbon Attachments, per set, 8¢

Chalk—

Carpenters' Blue.....pro., 50¢ @ 55¢
Carpenters' Red.....pro., 50¢ @ 55¢
Carpenters' White.....pro., 50¢ @ 55¢

Checks, Door—

Bardley's.....45%
Pullman, per gro.....\$4.00
Russwin.....35%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools.....30%
Farmers' Chests, with Tools.....20%
Machinists' and Pipe Fitters'
Chests, Empty.....45%
Tool Cabinets.....45%
C. E. Jennings & Co.'s Machinists'
Tool Chests.....75%

Chisels—

Socket Framing and Firmer
Standard List, 80¢ @ 10¢ @ 80¢ @ 10¢ @ 10%
Buck Bros.....35%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25¢ @ 75%
Socket Framing No. 15.....25¢ @ 75%
Swan's.....65¢ @ 70%
L. & I. J. White & Co.....30¢ @ 30¢ @ 5%

Tanged—

Tanged Firmers.....30¢ @ 35%
Buck Bros.....35%
C. E. Jennings & Co. Nos. 101, 181, 251
L. & I. J. White Co.....25¢ @ 5%

Cold—

1 lb.
Cold Chisels, good quality, 13¢ @ 15¢
Cold Chisels, fair quality, 11¢ @ 12¢
Cold Chisels, ordinary.....9¢ @ 10¢
Elmore Tool Mfg. Co.:
Cold Chisels.....50¢ @ 5%

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat, each \$3.00.....35¢ @ 5%
Blacksmiths'
Cincinnati Chuck Co.:
Independent 4-jaw Reversible.....35%
Empire.....25%
Jacobs' Drill Chucks.....25%
Pratt's Positive Drive.....25%
Skinner Lathe Chucks:
Independent.....35%
Universal, Reversible Jaws.....35%
Universal, Com. Style Jaws.....40%
Combination, Reversible Jaws.....35%
Combination, Com. Style Jaws.....40%
Round Body or Box Body, 2 Chuck
Jaws.....25%
Geared Scroll Chucks.....25%
Drill Chucks:
New Model, 25%; Geared Pat-
tern, 25%; Skinner Patent, 25%
Positive Drive.....40%
Planer Chucks.....25%
Standard Drill Press Vises.....35%
Face Plate Jaws.....35%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 10, 40%; No. 21.....35%
Scroll Combinations, Nos. 25 and
81.....30%
Geared Scroll, Nos. 33, 34 and 35, 25%
Independent Iron, Nos. 18 and 318, 35%
Independent Steel, No. 61.....25%
Union Drill, Nos. 000, 00, 100, 101,
102, 103, 104.....35%
Union Gear Drill.....35%
Universal, 11, 12, 16, 17, 13, 14, 15, 40%
Universal No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30,
38 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and
72.....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill.....50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%
Whittaker Mfg. Co.:
National Drill.....25%

Clamps—

Carriage Makers', Star, P., S. & W
Co.....50%
Besly, Parallel.....35¢ @ 10%
Hammer & Co.:
Adjustable.....20¢ @ 5%
Carriage Makers' H. P. Screw, 40¢ @ 5%
Myers' Hay Rack.....50%
Lineman's Swedish Nevertum.....50%
Saw Clamps, see Vises, Saw Filers'

Cleaners, Drain—

Ivan's Champion, Adjustable.....50%
Ivan's Champion, Stationary.....40%

Sidewalk—

American Fork & Hoe Co.:
Star 1/2 doz., Socket, \$4.00;
Shank, 1/2 doz., X 7 1/4, \$3.50; Shank,
X 8.....\$3.75
Cleavers, Butchers'—
Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each, \$10.75
20th Century Horse, each, \$5.00
Lightning Belt Horse, each, \$15.00
Chicago Belt Horse, each, \$20.00
Stewart's Enclosed Gear Ball
Bearing Horse, each, \$7.50
Stewart's New Model Sheep
Shearing Machine, each, \$12.75
Stewart Enclosed Gear Shear-
ing Machine, No. 8, each, \$9.75

Clips, Axle—

Regular Styles.....80¢ @ 80¢ @ 10%

Cloth and Netting, wire

—See Wire, &c.

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c.....75%
Compression Bibbs.....70%

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
Son's list.....40%
Leather, Walter B. Stevens & Son's
list.....60%

Compasses, Dividers, &c.—

Ordinary Goods.....75¢ @ 75¢ @ 5%

Conductor Pipe—

L. C. L. to Dealers:
Gal. Steel, Charcoal, Copper.

Northeastern:
70¢ @ 10¢ @ —% 50¢ @ 10¢ @ 7 1/2% 50¢ @ 10%

Eastern:
75¢ @ —% 50¢ @ 10¢ @ 7 1/2% 50¢ @ 10%

Central:
75¢ @ —% 60% 50¢ @ 10%

Northwestern:
75¢ @ —% 60% 50¢ @ 10%

Western:
70¢ @ 10¢ @ —% 50¢ @ 12 1/2% 50¢ @ 5%

Tennessee:
70¢ @ 10¢ @ —% 50¢ @ 12 1/2% 50¢ @ 10%

Southern:
70¢ @ 10¢ @ —% 50¢ @ 12 1/2% 50¢ @ 5%

Southeastern:
70¢ @ —% 50¢ @ 5% 50¢ @ 5%

Terms, 60 days; 2% cash 10 days. Fac-
tory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:
Galvanized, 1.85 \$2.00 \$2.25 \$2.50 \$3.00
Galvanized, Lined, side handles,
Gal.....2 3 4 5 6 8
Each.....\$1.35 \$2.15 \$2.40 \$3.30 \$4.15
White Enamelled.....10%
Azote Lined.....10%

Coppers' Tools—

See Tools, Coppers'.

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair
and heavier, 2 1/2¢; lighter
than 3 lb. to pair.....23 1/2¢

Cord—

Braided, Drab.....10¢ @ 35¢
Braided, White, Com. Nos. 8
to 12, 22¢; No. 7, 23¢; No. 6,
24¢. In lots of 12 doz. or
over, 1 cent less per pound.

Cable Laid Italian, lb., No. 18, 37¢
Italian, lb., No. 18, 25¢; B, 22¢
Common India.....10¢ @ 11 1/2¢
Cotton Sash Cord, Twisted, 18¢ @ 20¢
Patent Russia.....10¢ @ 20¢
Cable Laid Russia.....10¢ @ 21¢
India Hemp, Br'd'd.....10¢ @ 21¢
India Hemp, Twisted.....10¢ @ 13¢ @ 14¢
Patent India, Twisted.....10¢ @ 17¢
Pearl Braided, cotton, No. 6, 10 lb.
20¢; No. 7, 19¢; No. 8 to 12,
19¢. In 12 doz. to 100 doz. lots,
Eddystone Braided, Nos. 8 to 12,
20¢; 23¢; 6, 27¢.
Harmony Cable Laid Italian, Nos. 7
to 10.....10¢ @ 23¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per 100, \$2.00
Samson, Nos. 8 to 12:
B, Drab, 40¢; A, White, 40¢;
55¢; Italian, 40¢; White Cot-
ton, 50¢; Spot Cord.....50¢
Massachusetts, White.....10¢ @ 10¢
Massachusetts, Drab.....10¢ @ 12¢
Phoenix, White, Nos. 8 to 12.....27¢
Silver Laid, per lb.:
A, Drab, 40¢; B, White, 35¢;
B, Drab, 40¢; A, White, 35¢;
Italian Hemp, 40¢; Linen.....57¢ @ 5¢
See also Chain and Ribbon.

Wire, Picture—

Full Length.....90¢ @ —%
Short Length.....90¢ @ 20¢ @ —%
Hendryx Standard Wire Picture Cord.....90¢ @ 10%
Turner & Stanton Co. Wire Picture
Cord.....90%

Cradles—

Grain.....50%

Crayons—

White Round Crayons, Cases, 100
gro., \$8.00, \$8.50, \$9.00 and \$10.00
according to grade.

Zelnicke's Lumber:
White and Purple, Indelible.....17.50
Blue, Red, Green, Yellow and
Terra Cotta, \$6.50; Black.....\$4.50
Giant Lumber, 5/4 in. x 15-16 in.
round, all colors, \$12.00; Indi-
cibles, \$11.00; Blacks.....\$10.00
Genuine Soapstone, Metal Workers',
5 in. x 14 in. Round, \$2.50; 5 in. x
4 in. Square, \$1.75; 5 x 1/2 x 3-16,
\$2.50; 5 x 1/4 x 3-16.....\$3.00
Suremark, Black, \$2.25; Blue, Red
and Yellow.....\$2.50

Crooks, Shepherds'—

American Fork & Hoe Co.:
Montana.....1/2 doz. \$4.50

Crow Bars—See Bars, Crow.**Cultivators—**

American Fork & Hoe Co.:
Victor Garden.....50¢ @ 10%

Cutlery, Table

International Silver Company:
No. 12 M'd'm Knives, 1847, 1/2 doz. \$3.50
Star, Eagle, Rogers & Hamilton
and Anchor.....1/2 doz. \$3.00
Wm. Rogers & Son.....1/2 doz. \$2.50

Cutters—

H. H. Mayhew Co.....40%
Red Devil.....60%
H. Mfg. Co.....40%
Woodward.....50%

Meat and Food—

American.....30%
Nos.....401 402 403 404 405 406 407
Each.....\$7 \$7 \$10 \$12 \$25 \$50 \$60
Enterprise:
Nos.....5 10 12 22 32
Each.....\$2 \$3 \$2.75 \$1.50 \$6 25¢ @ 25¢ @ 7 1/2%
No. 202, \$1.50.....40¢ @ 7 1/2%
P. & W. Co.:
Ideal.....10¢ @ 10¢ @ 5%
Halter Giant.....60¢ @ 5%
Little Giant.....1/2 doz. 40¢ @ 50%
Nos. 305 310 312 320 322
\$35.00 \$48.00 \$14.00 \$72.00 \$68.00
New Triumph No. 655, 1/2 doz. \$24.00,
40%

Russwin Food, No. 1, \$24.00; No. 2,
\$27.00; 3, \$12.00.....45¢ @ 10¢ @ 10%
Enterprise Beef Shavers.....25¢ @ 30%

Slaw and Kraut—

Henry Diston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife.....1/2 doz. \$3.00
Combined Saw Cutter and Cori-
Grater.....1/2 doz. \$4.00

Tobacco—

All Iron, Cheap.....1/2 doz. \$1.25 @ 1.50
Enterprise.....25¢ @ 30%
National, 1/2 doz. No. 1, \$21, No. 2,
\$18.....40%

Diggers, Post Hole, &c—

Diston's:
Rapid, 1/2 doz., \$24.00.....25%
Samson, 1/2 doz., \$31.00.....25%
Iwan's Pat. Post Hole and Well
Auger.....40%
Vaughan Pattern Post Hole Augers,
1/2 doz., \$7.00
Perfection Post Hole Diggers, 1/2
doz., \$8.50
Split Handle Post Hole Diggers,
1/2 doz., \$7.50
Hercules Pattern, 1/2 doz., \$9.50
Kohler's, 1/2 doz., Universal, \$14.00;
Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$9.00; Rival,
\$8.50; Pioneer.....\$7.50
Never-Break Crucible Steel Post
Hole Diggers.....60%

Dividers—See Compasses.**Drawing Knives—**

See Knives, Drawing.

Dressers Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmith's Common Drilling
Machines.....\$1.50 @ 1.75
Breast, Millers Falls.....15¢ @ 10%
Breast, P. S. & W.....33%
C. & C. Ratchet.....25%
Reversible Ratchet Die Stocks.....25%
Goodell Automatic Drills, 50¢ @ 10¢ @ 10%
Millers Falls Automatic Drills,
Graves, per doz., Nos. 1, \$1.86;
2, \$8.16
Millers Falls Automatic Drills, 33¢ @ 10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Im-
proved.....40¢ @ 45%
Ratchet, No. 012.....40¢ @ 45%
Ratchet, Celebrated.....40¢ @ 45%
Ratchet, Whitney's, P. S. & W.....40¢ @ 45%

Star Drills.....50¢ @ 10%
Star Pipe Drills.....50%
Star Drill Holders.....50¢ @ 10%
Star Drill Points.....50¢ @ 10%
Whitney's Adjustable, No. 10, \$12.00,
35% @ 5%

Twist Drills—

Bit Stock.....70¢ @ 70¢ @ 10%
Taper and Straight Shank.....65¢ @ 65¢ @ 10%

Drivers, Screw—

Screw Driver Bits, per doz. 45¢ @ 50¢
Babsey's Screw Holder and Driver,
doz., 2 1/2-in., \$6; 4-in., \$7.50; 6-in.,
\$9
Buck Bros' Screw Driver Bits.....50%
Champion.....50%
Diston's Screw Drivers, Handles
and Ferrules.....70%
Elmore Tool Mfg. Co.:
Elmore.....60%
Hartford.....66%
Indestructible.....55¢ @ 5%
Standard Nevertum.....75¢ @ 5%
Star.....75¢ @ 5%
Screw Driver Bits.....25%
Fray's Hol. H'dle Sets, No. 3, \$12.50;
Ford's Brace Screw Drivers.....40¢ @ 10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....60¢ @ 65¢ @ 10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, 1/2 doz., Nos. 11, \$9.95;
12, \$13.73; 20, \$18.17; 21, \$18.46; 41,
\$13.45; 42, \$17.21.
Swan's:
Nos. 7565 to 7568, 60%; No. 7540,
40¢ @ 10%

Eave Trough, Galvanized—

Territory. Gal. Steel. Copper.

Northeastern.....75¢ @ 10¢ @ 5%
Eastern.....80%
Central.....80¢ @ 10¢ @ 5%
Northwestern.....80¢ @ 10¢ @ 5%
Western.....80¢ @ 5%
Tennessee.....80¢ @ 5%
Southern.....75¢ @ 10%
Southeastern.....75¢ @ 10¢ @ 2 1/2% @ 50¢ @ 5%

Terms.—2% for cash. Factory shipments
generally delivered.

Note.—Lower prices are quite general
owing to market irregularities.

See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel, Galv. C. I. and
Copper.

Sizes 2, 3, 4.....80%
Sizes 1 1/2, 2 1/2, 3 1/2, 5, 6.....60¢ @ 10%
No. 26.....50%
No. 24.....50%
Copper Elbows.....85%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40¢ @ 10¢ @ 10%
Edwards, Royal Blue.....40¢ @ 10¢ @ 10%
Reeves, Dover Flat Crimp.....40¢ @ 10¢ @ 5%

Emery, Turkish—

4 to \$4 to
48: 220: Flour.

Kegs.....10 5¢ 5 1/2¢ 5 1/4¢
1/2 Kegs.....10 5 1/4¢ 5 1/2¢ 5 1/4¢
1/4 Kegs.....10 5 1/4¢ 5 1/2¢ 5 1/4¢

10-lb. cans, 10 in case... 7 4 6 4
 10-lb. cans, less than 10... 10 4 10 4
 Less quantity... 10 4 10 4
 NOTE.—In lots 1 to 5 tons a discount of 10% is given.

Extensions, Bit—
 Ford's Auger Bit Extensions... 40¢
Extractors, Lemon Juice—
 —See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's Jap'd and Galv... 50 & 5¢
 Welling's... 50 & 5¢
 Upson's Patent... 50 & 5¢

Cord and Weight—
 Ives, # gro., \$1.08... 12¢
 Titan, # gro., \$0.66... 12¢
Corrugated—
 Acme Corrugated Fasteners... 70%

Faucets—

Cork Lined... 50¢
 Metallic Key, Leather Lined... 60¢
 Red Cedar... 40¢
 Petroleum... 70¢
 B. & L. B. Co.:
 Metal Key... 60¢
 Star... 60¢
 West Lock... 50¢
 John Sommer's Peerless Tin Key... 40¢
 John Sommer's Boss Tin Key... 50¢
 John Sommer's Victor M. Key... 50¢
 John Sommer's Duplex Metal Key... 60¢
 John Sommer's Diamond Lock... 40¢
 John Sommer's I. K. L. Cork Lined... 50¢
 John Sommer's Reliable Cork Lined... 50¢
 John Sommer's Chicago Cork Lined... 60¢
 John Sommer's O. K. Cork Lined... 60¢
 John Sommer's No Brand Cedar... 50¢
 John Sommer's Perfection Cedar... 40¢
 Self Measuring:
 Enterprise, Self Measuring and Pump, # doz., \$36.00... 40¢
 Lane's, # doz., \$36.00... 40¢
 National Measuring, # doz., \$36.00... 40¢

Felloe Plates—
 See Plates, Felloe.

Files—Domestic—
 List Nov. 1, 1899.

Best Brands... 70¢
 Standard Brands... 75¢
 Lower Grade... 75¢
 Diaston's Superfine... 60¢
 Gold Medal... 70¢
 McCaffrey's American Standard... 60¢

Imported—
 Studs' Tapers, Studs' List, July 24, '97... 33 1/2 40%

Fixtures, Fire Door—
 Richards Mfg. Co.:
 Universal, No. 103; Special, No. 104... \$3.75
 Fusible Links, No. 96... 50¢
 Expansion Bolts, No. 107... 60¢

Grindstone—
 Net Prices:
 Inch... 15 17 19 21
 Per doz... \$3.60 3.85 4.15 4.65
 Peck, Stow & Wilcox Co.:
 In... 15 17 19 21 24
 \$1.00 4.40 4.75 5.50 6.30... 30%
 Reading Hardware Co... 60%

Fodder Squeezers—
 See Compressors.

Forks—
 American Fork & Hoe Co.:
 Iowa Dig-Ezy Potato... 70¢
 Hay, Regular, 3-time... 55¢
 Hay, Regular, 4-time... 60¢
 Champion, Hay... 60¢
 Acme, Hay... 60¢
 Manure, Regular, 4-time... 65¢
 Manure, Regular, 5 and 6 time... 70¢
 Champion, Manure... 65¢
 Columbia, Manure... 70¢
 Acme, 4-time... 60¢
 Round Shoulder Header, 4-time... 65¢
 Champion, Header... 65¢
 Dakota, Header... 65¢
 Kansas Header... 65¢
 Wood, Barley... 35¢
 Steel, Barley... 65¢
 Columbia, Spading... 70¢

Frames—Wood Saw—
 White, 8'x12' Bar, per doz... 75¢
 Red, 8'x12' Bar, per doz... 1.00¢
 Red, 8'x12' Bar, per doz... 1.10¢

Freezers, Ice Cream—
 Qt... 1 2 3 4 6
 Luch... \$1.25 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—
 See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Fuse—Per 1000 Feet.
 Hemp... \$2.75
 Cotton... 3.20
 Waterproof Spl. Taped... 3.65
 Waterproof Dbl. Taped... 4.40
 Waterproof Tpl. Taped... 5.15

Gates, Molasses and Oil—
 Stebbins' Pattern... 80¢

Gauges—
 Marking, Mortise, &c... 50¢
 Marking, Mortise, &c... 50¢
 Diaston's Marking, Mortise, &c... 50¢
 Wire, Brown & Sharpe's... 33 1/2¢
 Wire, Morse's... 25¢
 Wire, P. S. & W. Co... 33 1/2¢

Gimlets—Single Cut—
 Numbered assortments, per gro.
 Nail, Metal, No. 1, \$2.00; 2, \$2.30
 Spike, Metal, No. 1, \$1.00; 2, \$1.30
 Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60
 Spike, Wood Handled, No. 1, \$1.30; 2, \$1.60

Glass, American Window—
 See Trade Report.

Glasses, Level—
 Chapin-Stephens Co... 65¢
 Diaston & Sons... 60¢

Glue, Liquid Fish—
 Bottles or Cans, with Brush, 25¢
 Elwell's... 50%

Grease, Axle—
 Common Grade... \$6.00
 Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, 1 lb., \$1.20; 2 lb., \$2.00
 Helmet Hard Oil... 25¢

Griddles, Soapstone—
 Pike Mfg. Co... 33 1/2¢
Grinders—
 Pike Mfg. Co.:
 Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power)... 33 1/2¢
 Mower Knife and Tool, \$5.00... 40¢
 Royal Mfg. Co.:
 Hand and Foot Power, each, Nos. 01, \$1.75; 1A, \$2.50; 10, \$5.00
 Sickle Grinders, each, Nos. 20, \$5.00; 20A, \$6.00; 20A Combined, \$6.50
 Disc Grinders, each, \$2.50... 40%

Grindstones—
 Pike Mfg. Co.:
 Improved Family Grindstones, # inch, # doz., \$2.00... 33 1/2¢
 Richards Mfg. Co., Eli and Cycle Ball Bearing, mounted... 40%

Grips, Nipple—
 Perfect Nipple Grips... 40¢

Halters and Ties—
 Cor Ties... 70¢
 Bridgeport Chain Co.:
 Triumph Coil and Halters... 40¢
 Brown Coil and Halters... 45¢
 Brown Cow Ties... 50¢
 Brown Tie Outs... 70¢
 Covert Mfg. Co.:
 Web... 30¢
 Jute Rope... 30¢
 Sisal Rope... 20¢
 Cotton Rope... 45¢
 Hemp Rope... 45¢
 Oneida Community:
 Am. Coil and Halters... 40¢
 Am. Cow Ties... 45¢
 Niagara Coil and Halters... 45¢
 Niagara Cow Ties... 45¢

Hammers—
 Heller's Machinists... 55¢
 Heller's Farriers... 40¢
 Peck, Stow & Wilcox Co.:
 Crucible Steel... 40¢
 Forgers... 40¢
 Riveting... 40¢
 Machinists... 60¢
 Blacksmiths... 50¢
 Elmore Shoemakers' Hammers... 75¢
 Fayette R. Plumb:
 A. E. Nail... 40¢
 Eng. and B. S. Hand... 50¢
 Machinists' Hammers... 60¢
 Rivet and Tinner's... 40¢
 Victor Magnetic Tack, # gro... 37 1/2¢

Heavy Hammers and Sledges—
 Under 3 lb., per lb., 50¢... 80¢
 3 to 5 lb., per lb., 40¢... 80¢
 Over 5 lb., per lb., 30¢... 80¢
 Over 5 lb., per lb., 30¢... 80¢

Handles—
 Agricultural Tool Handles
 Aze, Pick, &c... 60¢
 Hoe, Rake, &c... 40¢
 Fork, Shovel, Spade, &c... 40¢
 Long Handles... 40¢
 D Handles... 40¢

Cross-Cut Saw Handles—
 Atkins... 40¢
 Diaston's Handles and Saw Tabs... 45¢

Mechanics' Tool Handles—
 Auger, assorted... \$1.00
 Brad Axl... \$1.65
 Chisel Handles, Ass'd, per gro.:
 Tanged Firmer, Apple, \$2.40
 \$2.65; Hickory... \$2.15
 Socke, Firmer, Apple, \$1.75
 \$1.95; Hickory... \$1.60
 Socket Framing, Hickory... \$1.60
 File, assorted... \$1.50
 Hammer, Hatchet, &c... 60¢

Hand Saw, Varnished, 85¢; Not Varnished... 65¢

Plane Handles—
 Jack, doz., 90¢; Fore, doz... 45¢
 Chapin-Stephens Co.:
 Carving Tool... 30¢
 Chisel... 60¢
 File and Awl... 60¢
 Saw and Plane... 60¢
 Screw Driver... 30¢
 Millers Falls Adj. and Ratchet Auger Handles... 15¢
 Nicholson Simplicity # gro... \$0.85

J. L. Osgood:
 Indestructible File and Tool, # gro., No. 1, \$2.00; No. 2, \$2.50; No. 3, \$3.00; No. 4, \$3.50; No. 5, \$4.00

W. A. Zelnicker Supply Co.:
 Hammer, # doz., 12 in... \$2.00
 14 in... \$2.00; 16 in... \$2.30; 18 in... \$2.50; 20 in... \$2.70; 22 in... \$3.00; 24 in... \$3.30; 26 in... \$3.50; 30 in... \$3.80
 Sledge, # doz., oval, 30 in... \$3.50; octagon, 30 in... \$3.50; oval, 36 in... \$4.00; octagon, 36 in... \$4.00
 Axe, # doz., 28 to 31 in... \$5.00; 36 in... \$5.80
 Adze, # doz., 36 in... \$5.80; 36 in... \$7.80
 Pick, # doz., R. R., 36 in... \$8.00; coal, 31 in... \$5.80
 Hatchet, # doz., 12 to 14 in... \$2.00

Hangers—
 NOTE.—Barn Door Hangers are generally quoted per pair, without track and Prior Door Hangers per double set with track, &c.

Chicago Spring Butt Co.:
 Friction... 25¢
 Oscillating... 25¢
 Big Twin... 25¢
 Chisholm & Moore Mfg. Co.:
 Baggage Car Door... 50¢
 Elevator... 30¢
 Railroad... 50¢
 Cronk & Carrier Mfg. Co.:
 Loose Axle... 60¢
 Roller Bearing... 70¢
 Griffin Mfg. Co.:
 Solid Axle, No. 10, \$12.00... 60¢
 Roller Bearing, No. 11, \$15.00... 60¢
 Roller Bearing, Ex. Hvy., No. 22, \$18.00... 60¢
 Bull Dog, \$24.00... 70¢
 Lane Bros. Co.:
 Standard, \$3.15; No. 105, \$2.65; New Model, \$2.80; New Champion per set of 4 Hangers, complete with track... \$2.25
 Barn Door, Standard... 60¢
 Hinged, Standard... 60¢
 Covered... 60¢
 Trolley Hangers and track... 50¢
 Lawrence Bros.:
 Cleveland... 70¢
 Clipper, No. 75... 60¢
 Crown... 55¢
 Cyclone, No. 40... 50¢
 Tandem, No. 50... 50¢
 New York... 55¢
 Trolley, No. 30, # pair... \$1.25
 McKinney Mfg. Co.:
 Roller Bearing, Nos. 1 and 2... 70¢
 Anti-Friction... 60¢
 Hinged Hangers, King Charm... 60¢
 Richards Mfg. Co.:
 Hangers, Nos. 47, 48, 117, 247, 604, 605
 Pioneer Wood Track, No. 3, \$2.25
 Roller B'g St'l Track No. 12, \$2.20
 Roller B'g St'l Track No. 13, \$2.50
 Roller B'g, Nos. 39, 41, 43, 70¢

Hero, Adj. Track No. 19, 50¢

Adjustable Track Tandem Trolley Track No. 16, 50¢

Best Steel Track No. 8, \$2.25

Auto Adj. Track No. 22, 50¢

Trolley B. D. No. 17, \$1.25; F. D. No. 120, \$2.25; No. 121, \$2.45; No. 150, \$2.50

Safety Underwriters F. D. No. 122, \$2.50

Tandem No. 44, 2 1/2 and 3 60¢

Palace, Adjustable Track No. 132, 50¢

Royal, Adjustable Track No. 122, 50¢

Ives' Wood Track No. 1, 25¢

Trolley B. D. No. 20, 50¢

Trolley B. D. No. 24, \$1.50; No. 27, \$1.40; No. 28, \$1.60

Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2, 70¢

Anti-friction, No. 42; No. 44, Sizes 2 1/2 and 3... 60¢

Hinged Tandem No. 45... 60¢

Folding Door B. B. Swivel No. 135... 40¢

Taylor & Boggia F. F. Kidder's Roller Bearing, # doz., 4 in... \$12.00; 5 in... \$14.00

Myers' Stayon Hangers... 60%

Hangers—Garment—
 Pullman Trousers, # gro., No. 1 \$9.00; No. 4, \$24.00; No. 5, \$16.50; No. 8, Black Enamel, \$7.50; No. 10, \$21.00; No. 12, \$3.00; No. 15, Rods, \$9.00; No. 18, Loops... \$10.00
 Victor Folding... # gro. \$9.60

Gate—
 Myers' Patent Gate Hangers, # doz., net... 50%

Joist and Timber—
 Lane Bros. Co... 35%

Hasps—
 Griffin's Security Hasp... 50¢
 McKinney's Perfect Hasp, # doz... 60%

Hatchets—
 Regular list, first qual... 50¢
 Second quality... 60¢

Heaters, Carriage—
 Clark, No. 5, \$1.25; No. 5B, \$1.50; No. 3, \$1.75; No. 3D, \$2.00; No. 7D, \$2.25; No. 3E, \$2.50; No. 1, \$3.00... 25¢
 Clark Coal, # doz... 60%

Hinges—
 Blind and Shutter Hinges
 Surface Gravity Locking Blind:
 Doz. Sets with Fastenings, No. 1, \$0.70; No. 3, \$1.25; No. 5, \$2.65
 Mortise Shutter... 80%
 Mortise Reversible Shutter... 80%
 North's Automatic Blind Fixtures, No. 2, for Wood, \$3.00; No. 3, for Brick, \$1.50
 Charles Parker Co... 70%
 Parker Wire Goods Co... 70%
 Hale & Benjamin Automatic Blind Hinges... 20%
 Hale's Blind Awning Hinges, No. 110, for wood, \$9.00; No. 111, for brick, \$9.00... 20%

Reading's Gravity—
 Stanley's Steel Gravity Blind Hinges, No. 14475, # doz., sets, without screws, \$0.55; with screws, \$1.25
 Wrightsville Hardware Co.:
 O. S. Lull & Porter... 75¢
 Acme, Lull & Porter... 75¢
 Queen City Reversible... 75¢
 Shepard's Noisels, Nos. 60, 65, 65... 75¢
 Niagara Gravity Locking, Nos. 1, 3 & 5... 75¢
 Clark's O. P., No. 1... 75¢
 Clark's O. P., Nos. 3 and 5... 75¢
 Tip Pat'n, No. 1... 75¢
 Clark's No. 3... 75¢
 Buffalo Gravity Locking, Nos. 1, 3 & 5... 75¢
 Shepard's Double Locking... 75¢
 Champion Gravity Locking... 75¢
 Picner... 75¢
 Empire... 65¢
 W. H. Co.'s Mortise Gravity Locking, No. 2... 60%

Gate Hinges—
 Clark's or Shepard's—Doz. sets:
 No. 1, 2, 3... 2 1/2 5 00
 Hinges with Latches... 1.25 1.90 3.50
 Latches only... 70 75 35
 New England:
 With Latch... doz... \$2.00
 Without Latch... doz... \$1.60
 Reversible Self-Closing:
 With Latch... doz... \$1.75
 Without Latch... doz... \$1.55
 Western:
 With Latch... doz... \$1.75
 Without Latch... doz... \$1.15
 Wrightsville Hardware Co.:
 Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3... 70%

Miscellaneous—
 Griffin Mfg. Co., Fleur de Lis Surface Hinges, # doz, prs... \$1.00

Pivot Hinges—
 Bommer Bros, Pivot, Ball Bearing... 40%
 Lawson Mfg. Co., Matchless... 30%

Spring Hinges—
 Holdback, Coat Iron... \$0.75
 Non-Holdback, Coat Iron... \$0.75
 J. L. Barclay:
 Barclay's Non-Checking Mortise Floor Hinges... 40%
 Barclay's Patent Checking... 33 1/2%
 Bommer Bros.:
 Spring Butt Hinges... 40%
 Surface Floor, Ball Bearing... 40%
 Mortise Floor, Ball Bearing... 40%
 Lavatory Hinges... 40%
 Non-Holdback Screen Door, Nos. 2000 and 900... 40%
 Holdback Screen Door, No. 900... # gro, \$9.00

Chicago Spring Butt Co.:
 Chicago Spring Hinges... 25%
 Triple End Spring Hinges... 25%
 Chicago (Hale) Spring Hinges... 50%
 Garden City Engine House... 25%
 Keene's Saloon Door... 25%
 Columbian Hardware Co.:
 Acme, Wrought Steel... 30%
 Acme, Brass... 25%
 American... 30%
 Columbia, # gr., No. 14, \$3.00
 Columbia, Adj., No. 7, # gr... \$12.00
 Gem, new list... 30%
 Clover Leaf and Acorn, per gro... \$12.00
 Oxford, new list... 30%
 Floor Spring Hinges... 65¢
 Columbian Steel... 65¢

Lawson Mfg. Co.:
 Matchless Spring Hinges... 30%
 Matchless Jamb Hinges... 30%
 Richards Mfg. Co.:
 Superior Double Acting Floor Hinges... 40%
 Shelby Spring Hinge Co.:
 Buckeye All Steel Holdback Screen Door... # gr, \$9.00
 Chief Ball Bearings Floor Hinge... 50%
 Ball Bearing Door... 25%
 No. 77, Sheet Steel Holdback, # gr, pr... \$9.00

Standard Mfg. Co.:
 Champion Double Acting Door Hinge... 25¢
 Standard Double Acting Floor Hinge... 25¢
 Superior Spring Hinge Co.:
 Superior Spring Hinges... 40%
 Spring Hinges... 40%

Wrought Iron Hinges—
 Strap and T Hinges, &c, list February 10, 1908:
 Light Strap Hinges... 65%
 Heavy Strap Hinges... 75%
 Light T Hinges... 80%
 Heavy T Hinges... 100%
 Extra Heavy T Hinges... 65%
 Hinge Hasps... 40%
 Cor. Heavy Strap... 75%
 Cor. Ex. Heavy T... 65%
 Screw Hook { 6 to 12 in... 1b 3/4¢
 and Strap { 1 1/2 to 2 1/2 in... 1b 3/4¢
 { 2 1/2 to 3 1/2 in... 1b 3/4¢

Hitchers, Stall—
 Covert Mfg. Co., Stall Hitchers... 30¢

Hods—Coal—
 M'f'g's list, price per gross:
 Inch... 15 16 17 18
 Galv. Open... \$35 \$30 \$12 \$16
 Jap. Open... 26 28 31 35
 Galv. Funnel... 43 48 52 56
 Jap. Funnel... 33 36 39 43

Masons' Etc.
 Cleveland Wire Spring Co.:
 Steel Brick, No. 122... each \$1.05
 Steel Mortar, No. 138... each \$1.35

Extra 5¢ @ 10% often given.

Extra 10% often given on most of these Hinges.

Extra, 5¢

Hoes— Eye —
Scovill and Oval Pattern,
 60¢ 10¢ 60¢ 10¢ 10¢
Grub, list Feb. 23, 1899,
 70¢ 10¢ 70¢ 10¢ 10¢
 D. & H. Scovill..... 27½¢
 Am. Fork & Hoe Co. (Scovill Pat-
 tern)..... 60¢ 5¢

Handled—
 Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
 Star Double Bit..... \$2.50
 American Fork & Hoe Co.:
 Regular, Cotton..... 75¢ 10¢ 5¢ 2½¢
 Crescent, Cultivator..... 75¢ 2½¢
 Mattock, Senior..... 70¢
 Mattock, Junior..... 70¢
 Sprouting..... 50¢
 Tobacco, Harper's..... 66¢ 15¢ 10¢
 Warren..... 55¢ 10¢ 10¢
 Ivanhoe..... 65¢ 15¢ 10¢
 Cultivator, B B 6..... 70¢ 10¢ 10¢ 5¢
 Cultivator, B B 6½..... 70¢ 10¢ 10¢ 5¢
 Weeding, Acme..... 72¢ 10¢ 10¢ 2½¢
 Scuffle, Lightning..... 60¢ 5¢

Hoisting Apparatus—
 See Machines, Hoisting.

Holders— Bit—
 Angular, ½ doz., \$21.00..... 45¢ 10¢

Door—
 Bardeley's, Iron, 40%; Brass and
 Bronze..... 25¢
 Empire..... 50¢
 Pullman..... 25¢
 Richards Mfg. Co.: No. 11, Ever-
 ready, 40%; Nos. 118, 119, Sure
 Grip..... 50¢
 Superior..... 40¢

File and Tool—
 Nicholson File Holders and File
 Handles..... 33½¢ 40¢

Fruit Jar—
 Triumph Fruit Jar Holder, ½ gross,
 \$18.00; ½ doz..... \$2.00

Trace and Rein—
 Fernald Double Trace Holder, ½ doz.,
 pairs..... \$1.25
 Dash Rein Holder, ½ doz..... \$1.25

Hones—Razor—
 Pike Mfg. Co., Belgian and Swaty,
 50%; German..... 33½¢

Hooks—Cast Iron—
 Bird Cage, Reading..... 40¢
 Clothes Line, Reading List..... 40¢
 Coat and Hat, Reading..... 45¢ 20¢
 Coat and Hat, Wrightville..... 60¢ 10¢
 Harness, Reading List..... 40¢

Wire—
 Belt, Nos. 1 to 15..... 75¢ 10¢ 80¢
 Wire C. & H. Hooks..... 50¢ 80¢ 10¢
 Bradley Metal Clasp Wire, Coat and
 Hat, 75¢ 10¢ 80%; Ceiling, 75¢ 10¢ 80¢
 Columbian Hdw. Co., Gem..... 75¢ 10¢
 Parker Wire Goods Co., King, 75¢ 10¢
 Wire Goods Co.:
 Acme, 60¢ 10%; Chief, 70¢ 10%;
 Crown, 75%; Oscar, 65¢ 10%;
 Brace, 75%; Oscar Harness, 50%;
 Ceiling, 75%.

Wrought Iron—
 Box, 6 in., per doz., \$0.90; 8 in.,
 \$1.15.
 Cotton..... dos. \$1.25 \$1.50
 Wrought Staples, Hooks, &c., Sure
 See Wrought Goods.

Miscellaneous—
 Hooks, Bench, See Staps, Bench.
 Bush, Light, dos., \$6.20; Medium,
 dos. 75; Heavy, \$7.65
 Grass, best, all sizes, per doz.,
 \$2.75 \$3.00
 Grass, common grades, all sizes,
 per doz..... \$1.25 \$1.50
 Whiffletree..... 10¢ 5¢ 6¢
Hooks and Eyes:
 Brass..... 60¢ 60¢ 10¢
 Malleable Iron..... 70¢ 70¢ 10¢
 Corvett Mfg. Co., Gate and Scuttle
 Hooks..... 40¢
 Turner & Stanton Co., Cup and
 Shoulder..... 5¢ 10¢
 Bench Hooks—See Bench Staps.
 Corn Hooks—See Nuts, Corn.

Horse Nails—
 See Nails, Horse.

Horseshoes—
 See Shoes, Horse.

Hose, Rubber—
 Garden Hose, ¾-in.:
 Competition..... ft. 6¢ ½¢
 3-ply Guaranteed..... ft. 8½¢ 9¢
 4-ply Guaranteed..... ft. 9½¢ 12¢
 Cotton Garden, ¾-in., coupled:
 Low Grade..... ft. 8¢ 9¢
 Fair Quality..... ft. 10¢ 11¢

Irons— Sad—
 From 4 to 10..... 10¢ 2½¢ 2½¢
 B. B. Sad Irons..... 10¢ 3½¢ 3½¢
 Mrs. Potts', cents per set:
 Nos. 50 55 60 65
 Jap'd Caps..... 55 93 96 93
 Tin'd Caps..... 91 88 101 98
 New England Pressing, 10¢ 9¢ 11¢

Bar and Corner—
 Richards Mfg. Co., Bar, 60¢ 10%;
 Corner..... 60¢

Pinking—
 Pinking Irons..... dos. 60¢ 65¢
 See Coppers.

Irons, Soldering
 See Coppers.

Jacks, Wagons—
 Art Mfg. Co.:
 Auto Screw..... 30¢ 2%; Steel, 45¢
 Lockport..... 50¢
 Lane's Steel..... 30¢ 5¢
 Richards' Tiger Steel, No. 130..... 50¢ 10¢
 Smith & Hemenway Co.'s..... 25¢

Ladder—
 Richards Mfg. Co., Ladder Jacks, 50¢

Jointers—
 Pike Mfg. Co., Saw Jointers, \$7.00..... 40¢

Kettles—
 Brass, Spun, Plain..... 80¢ 25¢
 Enamelled and Cast Iron—See Ware,
 Hollow.

Knives—
 Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c..... 30¢
 Wilkinson Shear & Cutlery Co..... 60¢

Corn—
 Columbian Cutlery Co., Wilcut
 Brand Knives and Hooks..... 60¢
 American Fork & Hoe Co.:
 Easy Cut, ½ doz., No. 10 C H..... \$2.10
 Easy Cut, ½ doz., No. 10 B C H..... \$2.20
 Acme, ½ doz..... \$2.35
 Dent, ½ doz..... \$2.35
 Adjustable, Serrated, ½ doz..... \$1.90
 Serrated, ½ doz..... \$1.85
 Yankee, No. 1 C H..... \$1.35
 Yankee, No. 2 C H..... \$1.15

Drawing—
 Standard List..... 80¢ 10¢ 10¢
 C. E. Jennings & Co., Nos. 45, 46,
 25¢ 7½¢

Jennings & Griffin, Nos. 41, 42,
 66¢ 7½¢
 Swan's..... 66¢ 70¢
 Watrous..... 10¢ 5¢
 L. & I. J. White..... 20¢ 5¢ 25¢

Hay and Straw—
 Serrated Edge, per doz. \$5.00 \$5.50
 Iwan's Sickle Edge..... ½ doz. \$9.50
 Iwan's Serrated..... ½ doz. \$10.00

Miscellaneous—
 Farriers'..... doz. \$2.60 \$3.55
 Wostenholm's..... ½ doz. \$3.00 \$3.25

Knobs—
 Base, 2½-in., Birch or Maple,
 Rubber Tip..... gro. \$1.25 \$1.40
 Carriage, Jap., Drive, all sizes,
 gro. 35¢ 40¢
 Door, Mineral..... doz. 65¢ 70¢
 Door, Por. Jap'd..... doz. 70¢ 75¢
 Door, Por. Nickel..... doz. \$2.05 \$2.15
 Hardley's Wood Door, Shutters, &c. 15¢

Lacing, Leather—
 See Belting, Leather

Ladders, Store, &c.—
 Lane's Store..... 25¢
 Myers' Noiseless Store Ladders..... 50¢
 Richards Mfg. Co.:
 Improved Noiseless, No. 112..... 50¢
 Climax Shelf, No. 113..... 50¢
 Trolley, No. 109..... 50¢

Ladies, Melting—
 L. & G. Mfg. Co., Melting and
 Plumbers'..... 25¢
 P. S. & W..... 40¢ 10¢
 Reading..... 60¢

Lamps—
 Hammer's M. I. Hand..... 40¢

Lanterns—Tubular—
 Regular, No. 0..... doz. \$4.00 \$4.50
 Side Lift, No. 0..... doz. \$4.25 \$4.75
 Hinge Globe, No. 0, doz. \$4.25 \$4.75
 Other Styles..... 40¢ 5¢

Bull's Eye Police—
 3-inch..... \$3.75 \$4.00

Latches—Thumb—
 Roggin's Latches, Jap'd, with
 Screws..... doz. 35¢ 40¢

Door—
 Cronk & Carrier Mfg. Co., No. 101,
 ½ doz. \$2.00
 Richards' Bull Dog, Heavy, No. 123,
 50¢ 45¢
 Richards' Trump, No. 127..... \$1.50

Leaders, Cattle—
 Small..... dos. 50¢; large, 60¢
 Corvett Mfg. Co.:
 Cotton, 45%; Hemp, 45%; Jute,
 35%; Sisal, 20%.

Leathers, Pump—
 See Pumps.

Lifters, Transom—
 R. & E..... 10%

Lines—
 Wire Clothes, Nos. 18 19 20
 100 feet..... \$2.30 1.95 1.75
 75 feet..... \$1.95 1.65 1.50
 Samson Cordage Works:
 Solid Braided Chalk, Nos. 0 to 3, 40¢
 Solid Braided Masons'..... 30¢
 Silver Lake Braided Chalk, No. 0,
 \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3,
 \$7.50..... gr. 20%
 Masons' Lines, Shade Cord, &c.,
 White Cotton, No. 3½, \$1.50; No. 4,
 \$2.00; No. 4½, \$2.50; Colors, No. 3½,
 \$1.75; No. 4, \$2.25; No. 4½, \$2.75;
 Linen, No. 3½, \$2.50; No. 4, \$3.50;
 No. 4½, \$4.50..... 20%
 Tent and Awning Lines: No. 5,
 White Cotton, \$7.50; Drab Cotton,
 \$8.50..... 20%
 Clothes Lines, White Cotton: 50 ft.,
 \$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
 ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;
 100 ft., \$5.25..... 20%
 Turner & Stanton Co.:
 Solid Braided Chalk, Masons' and
 Awning Lines..... 20%
 Clothes Lines, White Cotton..... 20%
 Shade Cord, Cotton or Linen..... 20%

Locks— Cabinet—
 Cabinet Locks..... 33½¢ 33½¢ 5¢
Door Locks, Latches, &c.—
 NOTE—Net Prices are very often made
 on these goods.
 Reading Hardware Co..... 40%
 R. & E. Mfg. Co..... 10%

Padlocks—
 R. & E. Mfg. Co. Wrought Steel and
 Brass..... 75¢ 10%

Sash, &c.—
 Ives' Patent:
 Crescent..... 10%
 Automatic Gravity Metal Sash..... 10%
 gro., \$1.05 58¢
 Window Ventilating..... 10%
 Pullman Patent Ventilating Lock..... 25%
 Reading Sash Locks..... 40%
 Taylor Mfg. Co., Perfect Ventilating,
 ½ doz..... \$0.75 \$1.00

Machines—Boring—
 Com. Up'r, without Augers,
 \$2.00 \$2.25
 Com. Ang'r, without Augers,
 \$2.25 \$2.50
 Ford Auger Bit Co..... \$2.00
 Jennings, Nos. 1 and 4..... 25¢ 7½¢
 Millers' Falls..... 57½¢
 Snell's, Upright, \$2.65; Angular, \$2.00
 Swan's Improved..... 10¢ 10%

Corking—
 Reisinger Invincible Hand Power.....
 ½ doz. \$48.00

Fence—
 Williams' Fence Machines..... each, \$5.50

Hoisting—
 Moore's Anti-Friction Chain Hoist, 30%
 Moore's Hand Hoist, with Lock
 Brake..... 20%
 Moore's Cyclone High Speed Chain
 Hoist..... 25%

Ice Cutting—
 Chandler's..... 12½%

Washing
 Boss Washing Machine Co.: Per doz.
 Boss No. 1..... \$57.00
 Boss Rotary..... \$57.00
 Champion Rotary Banner No. 1, \$57.00
 Standard Champion No. 1..... \$50.00
 Standard Perfection..... \$27.00
 Cincinnati Square Western..... \$33.00
 Uneda American, Round..... \$33.00

Mallets—
 Hickory..... 45¢ 50¢ 30%
 Lignumvite..... 45¢ 50¢ 30%
 Tinnors' Hickory and Apple-
 wood..... doz. 45¢ 50¢ 30%

Mangers, Stable—
 Sweet Iron Works..... 50%

Mats, Door—
 Acme Flexible Steel..... 50%
 Elastic Steel (W. G. Co.), new list 50%
 Everlasting Flexible Steel..... 33½%

Mattocks—
 See Picks and Mattocks.

Milk Cans—
 See Cans, Milk.

Mills, Coffee, &c.—
 Enterprise Mfg. Co.:
 Coffee..... 20¢ 25¢
 Shell and Corn..... 25¢ 10¢
 National list Jan. 1, 1902..... 30%
 Parker's Columbia and Victoria..... 33½%
 Parker's Box and Side..... 50¢ 10%
 Swift, Lane Bros. Co..... 30%

Motors, Water—
 Divine's Red Devil..... 30%
 \$2.50 3.50 10.00 15.00..... 33½%
 No. 1 2 3 4
 Lippincott's:
 No..... 1 2 3 4
 \$2.50 3.50 10.00 15.00..... 33½%
 Pike Mfg. Co., Tool and Knife
 Grinding..... 33½%

Mowers, Lawn—
 NOTE—Net prices are generally quoted
 Cheapest, 10-in., \$2.00; advance
 10¢ for each size.
 Cheap, 10-in., \$2.25; advance 15¢
 20¢ for each size.
 Better Grade, 10-in., \$3.00; ad-
 vance 25¢ for each size.
 12 14 16 18-in.
 High Grade..... \$4.50 4.75 5.00 5.25
 Continental..... 50%
 Great American..... 70%
 Great American Ball B'r'g new list 70%
 Quaker City..... 70%
 Pennsylvania..... 60%
 Pennsylvania, Jr., Ball Bearing..... 50¢ 10¢ 5%
 Pennsylvania Golf..... 50%
 Pennsylvania Horse..... 33½¢ 5%
 Pennsylvania Pony..... 40¢ 5%

Nails—
 Wire Nails and Brads, Miscel-
 laneous..... 55¢ 55¢ 10%
 Out and Wire. See Trade Report.
 Hungarian, Finishing, Upholster-
 ers, &c. See Tacks.

Horse—
 Nos. 6 7 8 9 10
 Anchor..... 20 21 20 19 18 .. 10 lb.
 net, 12¢
 Coleman..... 13 12 12 11 11 net 10 lb.
 New Haven..... 21 21 20 19 18 .. 10 lb.
 Livingston..... 19 18 17 16 16 .. 10 lb.
 Western..... 10 lb 8½¢
 Jobbers' Special Brands, per lb. 9¢

Picture—
 1½ 2 2½ 3 in.
 Brass Hd, gro. 45 55 60 70
 Por. Head, gro. 1.10 1.10 1.10

Upholsters—
 Brass..... 30%
 Plated..... 30¢ 10%

Nippers—
 See Pliers and Nippers.

Nipples—
 Standard Nipple Co.:
 Wrought Pipe Nipples..... 80%

Nuts— Blank or Tapped.
 Cold Punched: Off list.
 Square..... 5.10¢
 Hexagon..... 6.00¢
 Square, C. T. & R..... 5.20¢
 Hexagon, C. T. & R..... 6.00¢

Hot Pressed:
 Square..... Off list.
 Hexagon..... 5.90¢
 6.10¢

Oakum—
 Best..... 10 6½¢
 U. S. Navy..... 10 6¢
 Navy..... 10 5¢
 Plumbers' Spun Oakum..... 2½¢ 3¢

Oil—
 Pike Mfg. Co., Stonoil..... 40%

Oil Tanks—
 See Tanks, Oil.

Oilers—
 Steel, Copper Plated..... 75¢ 10%
 Chase or Paragon:
 Brass and Copper..... 50¢ 10%
 Zinc..... 65¢ 10¢ 70%
 Railroad..... 60¢ 10¢ 10%
 American Tube & Stamping Co.:
 Spring Bottom Cans..... 70¢ 70¢ 10%
 Railroad Oilers, &c..... 60¢ 60¢ 10%
 Hero Fruit Jar Co.:
 Spring Bottom Cans..... 70¢ 70¢ 10%
 Railroad Oilers, etc..... 60¢ 60¢ 10%
 Malleable, Hammers' Improved, Nos.
 11, 12 and 13, 10%; Old Pattern,
 Nos. 1, 2, 3, 4, 50%
 Maple City Mfg. Co.:
 Spring Bottom Cans..... 70¢ 70¢ 10%
 Railroad Oilers, &c..... 60¢ 60¢ 10%

Openers—Packing Box—
 Hercules, ½ doz., \$24..... 30%

Can Openers—
 Per doz.
 Sprague, Iron Handle..... 30¢ 35¢
 Sprague, Wood Handle..... 40¢
 Sardinia Scissors..... \$1.75 \$3.00
 Can and Bottle Openers, ½ doz.,
 net: Yankee, \$0.75 \$0.85; Little
 Gem, \$0.50 \$0.65; Nifty..... \$0.75

Egg—
 Hartigan Nickel Plate, ½ doz., \$2.00;
 Silver Plate, \$4.00.

Packing—
 Asbestos Packing, Wick and
 Rope, any quantity..... 16¢ 17¢

Rubber—
 (Fair quality goods.)
 Sheet, C. I..... 11¢ 12¢
 Sheet, C. O. S..... 11¢ 12¢
 Sheet, C. B. S..... 11¢ 13¢
 Sheet, Pure Gum..... 40¢ 45¢
 Sheet, Red..... 40¢ 50¢
 Jenkins' "6", ½ lb, 50¢

Miscellaneous—
 American Packing..... 10 7¢ 10¢
 Cotton Packing..... 10 16¢ 25¢
 Italian Packing..... 10 9¢ 10¢
 Jute..... 10 4¢ 14¢
 Russia Packing..... 10 9¢ 10¢

Pails, Water, Well, &c.—
 See Buckets.

Paint—
 Dixon's Silica-Graphite, in 1 gal.
 pails and 5 gal. kegs, 25%; pack-
 ages of larger size..... 20%

Pans— Dripping—
 Standard List..... 75¢ 65¢ 75¢ 10%
 Edwards, Royal Blue..... 75%

Fry—
 Common Lipped:
 Nos..... 1 2 3 4 5
 Per doz..... \$0.75 0.85 0.95 1.15 1.30

Refrigerator, Galva.—
 12 14 16 18
 Per doz..... \$1.75 2.25 2.80 3.15

Paper—Building Paper
 Asbestos: 10 lb.
 Roll Board or Building Felt,
 6 to 30 lb., per 100 sq. ft., 2½¢
 Roll Board or Building Felt,
 3-32 and ¼ in., 45 to 60 lb.,
 per 100 sq. ft..... 3½¢
 Mill Board, Sheet, 40 x 40 in.,
 1-32 to ¼ in..... 3½¢
 Per roll.
 Rosin Sized Sheathing: 500 sq. ft.
 Light weight, 25 lbs. to roll,
 48¢ 55¢
 Medium weight, 30 lbs. to roll,
 50¢ 70¢
 Heavy weight, 40 lbs. to roll,
 75¢ 78¢
 Black Water Proof Sheathing,
 500 sq. ft., 1 ply, 65¢; 2 ply,
 85¢; 3 ply, \$1.10; 4 ply, \$1.25.
 Deafening Felt, 9, 6 and 4½ sq.
 ft. to lb., ton..... \$54.50
 Red Rope Roofing, 250 sq. ft.
 per roll..... \$1.75

Tarred Paper—
 1 ply (roll 400 sq. ft.), ton,
 \$34.00 \$38.00
 2 ply, roll 108 sq. ft..... 65¢
 3 ply, roll 108 sq. ft..... 88¢
 Slater's Felt (roll 500 sq. ft.), 80¢

Sand Paper and Cloth—
 Flint and Emery..... 50¢ 10%
 Garnet Paper and Cloth..... 25%

Parers—Apple—
 Goodell Co.:
 Family Bay State..... ½ doz. \$15.00
 Improved Bay State..... ½ doz. \$36.00
 New Lightning..... ½ doz. \$7.00
 Turn Table "8"..... ½ doz. \$6.00
 White Mountain..... ½ doz. \$5.00
 Bonanza Improved..... each \$7.50
 Pandey..... each \$10.00
 Eureka Improved..... each \$20.00
 New Century..... each \$20.00
 Ranger..... each \$30.00

Livingston Nail Co.:	per doz.	\$4.00
Daisy	per doz.	\$5.10
Little Star	per doz.	\$5.10
Rocking Horse	per doz.	\$5.10
Reading Hardware Co.:		
Advance	per doz.	\$1.00
Aladdin	per doz.	\$1.00
Reading 72	per doz.	\$3.25
Reading 75	per doz.	\$3.25

Orange—		
Goodell Co., Success—	each	\$20.00
Potato—		
Saratoga	per doz.	\$7.30
White Mountain	per doz.	\$5.00

Picks and Mattocks—		
(List Jan., 1908.)		
List		75¢ to 10%
Cronk's Handled Garden Mattock,	per doz.	\$3.00
		33 1/2%

Pinking Irons—		
See Irons, Pinking.		
Pins, Escutcheon—		
Brass	50¢ to 50¢ to 10%	
Iron, list Nov. 11, '85	60¢ to 60¢ to 10%	

Pipe, Cast Iron Soil—		
Eastern Prices:		
Standard, 2-6 in.	63%	
Extra Heavy, 2-6 in.	74%	
Fittings, Standard and		
Heavy	80 1/2%	

Pipe, Merchant—		
Carloads to Consumers:		
Steel		
Blk. Galv. Blk. Galv.		

1/2 and 1/4 in.		
3/4 in.		
1 in.		
1 1/4 in.		
1 1/2 in.		
2 in.		
2 1/2 in.		
3 in.		
3 1/2 in.		
4 in.		
4 1/2 in.		
5 in.		
5 1/2 in.		
6 in.		
6 1/2 in.		
7 in.		
7 1/2 in.		
8 in.		
8 1/2 in.		
9 in.		
9 1/2 in.		
10 in.		
10 1/2 in.		
11 in.		
11 1/2 in.		
12 in.		

Pipe, Vitrified Sewer—		
Carload lots.		
Standard Pipe and Fittings, 3		
to 2 1/2 in., f.o.b. factory:		
First-class	85%	
Second-class	87%	

Pipe, Merchant—	
Carloads to Consumers:	
Steel.	Iron.
Per 100 joints.	Per 100 joints.

Sausage Stuffers or FillersSee *Stuffers or Fillers, Sausage*.**Saw Frames—**See *Frames, Saw*.**Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Saws—**

Atkins':	
Circular	45%
Band	50@50.10
Butcher Saws	50%
Cross Cuts	45%
One-Man Cross Cut	50%
Narrow Cross Cut	50%
Hand, Rip and Panel	35.5
Miter Box and Compass	40%
Mulay, Mill and Drag	45%
Wood Saws	40.10
Chapin-Stephens Co.	
Turning Saws and Frames	30@30.10
Diamond Saw & Stamping Works:	
Sterling Kitchen Saws	30.10@10%
Diston's:	
Circular, Solid and Ins'ted Tooth	50%
Band, 2 to 18 in. wide	60%
Band, 4 to 14	60%
Crosscuts	50%
Narrow Crosscuts	50%
Mulay, Mill and Drag	40%
Framed Woodsaws	25%
Woodsaw Blades	25%
Woodsaw Rode, Tinned	15%
Hand Saws, Nos. 12, 9, 9, 16, d100	
D8, 12, 16, 17, 8	25%
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1	
0, 0, Combination	30%
Compass, Key Hole, &c.	35%
Hand Ice Saw	45%
Butcher Saws and Blades	30%
C. E. Jennings & Co.'s:	
Back Saws	16%
Butcher Saws	25.75@
Compass and Key Hole Saws	33 1/2@7 1/2
Framed Wood Saws	25.75@
Hand Saws	12%
Wood Saw Blades	33 1/2@7 1/2
Millers Falls:	
Butcher Saws	15.10@
Star Saw	15.10@
Massachusetts Saw Works:	
Victor Kitchen Saws	40.10@50%
Butcher Saws and Blades	35.40@
Peace & Richardson's Hand Saws	30%
Simonds':	
Circular Saws	45%
Crescent Groove and Cross Cut Saws	30%
One-Man Cross Cuts	40.10@
Gang Mill, Mulay and Drag Saws	45%
Band Saws	50%
Back Saws	25.25@7 1/2
Butcher Saws	35.35@7 1/2
Hand Saws	25.25@7 1/2
Hand Saws, Bay State Brand	45%
Compass, Key Hole, &c.	35.25@7 1/2
Wood Saws	40.75@
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws	50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A	25%
Diston's:	
Concave Blades	35%
Chromol Blades	30%
Hack Saw Frames	30%
Simonds, 25%; The Best	35%
Culley	35%
C. E. Jennings & Co.'s:	
Hack Saw Frames, Nos. 175, 180	40.47 1/2@
Hack Saws, Nos. 175, 180, complete	40.47 1/2@
Goodell's Hack Saw Blades	40.10@
Griffin's Hack Saw Frames	35.65@10%
Griffin's Hack Saw Blades	35.65@10%
Star Hack Saws and Blades	15.10@
Sterling Hack Saw Blades	30.10@5%
Sterling Hack Saw Frames	30.10@10%
Sterling Power Hack Saw Machines	each, No. 1, \$25.00; No. 2, \$30.00. 10%
Victor Hack Saw Blades	20%
Victor Hack Saw Frames	40%
Whitaker Mfg. Co.	
National Hand Blades, Hand Frames, Power Blades	40%

Scroll—

Barnes, No. 7, \$15	25%
Barnes' Scroll Saw Blades	40%
Barnes' Velocipede Power Scroll Saw, without boring attachment	\$18
with boring attachment	\$25
Lester, complete	\$10.00
Rogers, complete	\$3.50 and 15.10@

Scales—

Union Platform, Plain	\$2.10@2.20
Union Platform, Stpd.	\$2.20@2.30

Chatillon's:	
Eureka	25%
Favorite	30%
Grocers' Trip Scales	40%
The Standard Portable	40%
The Standard R. R. and Wag.	

Scrapers—

Box, 1 Handle	doz. \$1.85@2.10
Box, 2 Handle	doz. \$2.35@2.50
Ship	Light, \$2.00; Heavy, \$1.50
Chapin-Stephens Co., Box	30@30.10
Richards Mfg. Co., Foot	60%

Screws—Bench and Hand

Bench, Iron, doz. 1 in.	\$2.50@2.75; 1 1/4, \$3.00@3.25; 1 1/2, \$3.50@3.75
Bench, Wood	20@20.10
Hand, Wood	70.10@70.10
Chapin-Stephens Co., Hand	70@70.10
Coach, Lag and Hand Rail—Lag, Cone Point	80.45@
Coach, Gimlet Point	80.45@
Hand Rail	70.10@70.10
Jack Screws—	
Standard List	70.10@75%
Millers Falls	50.10@10%
Sweet Iron Works	70@75%

Machine—

Cut Tread, Iron, Brass or Bronze:	
Flat Head or Round Head	50@50.10
Fillister Head	40.40@10%
Roller Thread, F. H. or R. H.	75.10@
Iron	75.10@
F. H. or R. H., Brass, Nos. 8 to 14	65.10@

Set and Cap—

Set (Iron)	75.10@7 1/2%
Set (Steel), net advance over Iron	25%
Sq. Hd. Cap	70.10@7 1/2%
Hex. Hd. Cap	70.10@7 1/2%
Rd. Hd. Cap	50.47 1/2@
Fillister Hd. Cap	60.47 1/2@

Wood—

List July 23, 1909.	
Flat Head, Iron	87.45@
Round Head, Iron	85.45@
Flat Head, Brass	80.45@
Round Head, Brass	77.45@
Flat Head, Bronze	75.45@
Round Head, Bronze	72.45@
Drive Screws	87.45@

Scroll Saws—

See <i>Saws, Scroll</i> .	
Scythes—	Per doz.
Plain Grass, Cutting Edge Polished	\$6.25@8.50
Clipper, Bronzed Web	\$6.50@6.75
Solid Steel, Web and Backs Polished	\$7.00@7.25
Bush, Weed and Bramble	
Painted	\$6.50@6.75
Grain, Painted, Cutting Edge Polished	\$8.25@8.50
Clipper Grain, Bronze Web	\$8.50@8.75

Seeders, Raisin—

Enterprise	25@30%
Sets—Awl and Tool—	
Fray's Tool Handles, Nos. 1, \$12; 2, \$16; 3, \$12	50%
Millers Falls Adj. Tool Handles, No. 1, \$12; No. 4, \$12; No. 5, \$18. 20.10@	

Garden Tool Sets—

American Fork & Hoe Co.	
Rake, Shovel and Hoe, 3 doz. sets, No. 3 P F	\$7.25

Sets, Nail—

Octagon	gro. \$3.50@3.75
Buck Bros.	27 1/2%
Elmore Tool Mfg. Co.	30%
Mayhew's	gro. \$9.00
Nail's Corrugated, Cup Pt.	10.10@
Nail's Knurled, Cup Pt.	40.10@
Victor Knurled, Cup Pt.	gro. \$7.50

Rivet—

Regular list	75@75.10%
Saw—	

Atkins':	
Adjustable	40%
Diston's Star, Monarch and Triumph	30%
Giant Royal Cross Cut	doz. \$7.50
Morrill's No. 1	\$15.00
No. 3 and 4, Cross Cut	\$20.60
No. 5, Mill	\$30.00
No. 10, 11	\$15.00
No. 1 Old Style	\$10.00
Special	\$16.25
Royal, Hand	doz. \$4.50
Seymour Smith & Son's	65%
Tamitor Positive	doz. \$6.75

Shaving—

Fox Shaving Set, No. 30	
doz., net	\$24.00
Smith & Hemenway Co., s.	75%

Sharpeners, Knife—

Pike Mfg. Co.	
Fast Cut Pocket Knife Hones	doz. \$1.50
Mounted Kitchen Sand Stone	doz. \$1.50
Natural Grit Carving Knife Hones	doz. \$3.00
Quick Cut Emery Carving Knife Hones	doz. \$1.50
Quick Edge Pocket Knife Hones	doz. \$2.50

Skate—

Smith & Hemenway Co., Eureka	50%
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Shaves, Spoke—

Iron	doz. \$1.25
Wood	doz. \$2.00
Chapin-Stephens Co.	30@30.10
Goodell's	doz. \$9.00
Seymour Smith & Son's	50%

Shears—

Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.
Straight Trimmers, &c.	
Best quality Jap.	70.10@5%
Best quality Nickel	60.10@5%
Tailors' Shears	40.40@10%
Acme Cast Shears	40.40@5%
Columbian Cutlery Co.	
Sheep, 1900 list	30.10@5%
Grass or Mule	50.10@
W. H. Compton Shear Co.	
Japan Handles, Nickel Blades	60.10@5%
Full Nickel	50.10@5%
Heinrich's Tailor's Shears	10%
National Cutlery Co.'s Nickel Plated	60.10@
60.10@ Japan Handles	70.10@
J. W. & Son's Co.	
Best quality Jap.	60.10@
Best quality Nickel	50.10@
Tailors	25%

Tinners' Snips—

Steel Blades	30.45@20.10%
Steel Cold Blades	40.10@
Acme Cast Snips	40.10@5%
W. H. Compton Shear Co., Forged Steel Handles	35%

Forged Handles, Steel Blades, Ber-	
lin	30%
Heinrich's Snips	40%
Jennings & Griffin Mfg. Co.'s 8 1/2 to 10 in.	33 1/2@7 1/2
National Cutlery Co.'s Forged Steel	50%
Niagara Snips	40%
P. S. & W. Forged Handles	25%
W. R. W.	50%
J. Wiss & Sons Co.	
Wiss Forged Steel	25%

Pruning Shears—

Columbian Cutlery Co.	
Hedge, Wilcut Brand	60.10@
Lawn and Border, Wilcut Brand	60.10@
W. H. Compton Shear Co., Dropped Forged Steel	35%
Cronk's Hand Shears	33 1/2%
Cronk's Wood Handle Shears	33 1/2%
Diston's Combined Pruning Hook and Saw	doz. \$18.00
Diston's Pruning Hook only	doz. \$12.00
J. T. Henry Mfg. Co.'s	
Pruning Shears, all grades	40%
P. S. & W. Co.	40.10@
Seymour Smith & Son's:	
Hand Shears	70%
Standard Tree Pruners	75.10@
Wood Handle Pruning Shears	40%

Sheaves—Sliding Door—

Reading	40%
R. & E. list	15%

Sliding Shutter—

Reading list	40%
R. & E. list	15%

Shells—Shells, Empty—

Brass Shells, Empty:	
Climax, 10 and 12 gauge	60.45%
Club, Rival, 6.45%; First Quality	60.45%
Paper Shells, Empty:	
New Rapid, 10, 12, 16 and 20 gauge	25.10%
Climax, 10 and 12 gauge; Acme and Magic, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge;	
Leader grade	25.45%
Union, League, 10 and 12 gauge, Navy Grade	25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge	20%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade	20%

Shells, Loaded—

Loaded with Smokeless Powder, medium grade	40.45%
Loaded with Smokeless Powder, high grade	40.10@10%
Union Metallic Cartridge Co.	
New Club, Black Powder	40%
Nickel Club, Smokeless Powder	40.45%
Arrow, Smokeless Powders	40.10@10%
Winchester:	
Smokeless Repeater Grade	40.45%
Smokeless Leader Grade	40.10@10%
Black Powder	40%

Shingles, Metal—Per Sq.

Edwards Mfg. Co.	
14 x 20	Painted. Galv.
10 x 14	4.50 6.25
7 x 10	4.75 6.50
Wheeling Corrugating Co.	
Dixie, 14 x 20 in.	\$4.05 \$5.05
Dixie, 10 x 14 in.	4.25 5.45
Dixie, 7 x 10 in.	5.25 6.75

Shoes, Horse, Mule, &c.—

F.O.B. Pittsburgh:	
Iron	per keg \$1.10
Steel	per keg \$3.85
Burden's, all sizes	per keg \$3.90

Shot—

Drop, up to B	25-lb. bag. \$1.70
Drop, B and larger	1.95
Buck	1.95
Chilled	1.95
Dust	2.30

Shovels and Spades—

Association List	40.47 1/2@40.10%
Avery Stamping Co.	40%

Snow Shovels—

Long Handle	\$2.50@2.75
Wood and Mall, D Handle	\$2.65@2.90

Sieves and Sifters—

Hunter's Imitation, gro.	\$9.50
Hunter's Genuine, per gro.	\$12.00

Sifters—Ash—

Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each	\$3.25
doz.	\$39.00

Sieves, Seamless Metallic—

Mesh	14 16 18 20
Iron Wire	\$1.05 1.05 1.10 1.20
Tinned Wire	\$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.	
Mesh 18, Nested	doz. \$0.90@0.95
Mesh 20, Nested	doz. \$1.00@1.05
Mesh 24, Nested	doz. \$1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:	
12 x 24 to 22 x 36 in.	60%
20 x 24 to 24 x 50 in.	50%
24 x 60 to 24 x 120 in.	30%
Barnes' low list	60%

NOTE—There is not entire uniformity in lists used by jobbers.**Skains, Wagon—**

Cast Iron	70@70.10%
Steel	35@40%

Slates, School—

Factory Shipments.	
"D" Slates	50@50.10%
Eureka, Unexcelled Noiseless	
60.47 tens.	
Victor A, Noiseless	60.47 tens 45%

Slaw Cutters—See Cutters.**Snaps, Harness—**

German	40@40.10%
Cover Mfg. Co.	
Derby, 25%; Yankee, 30.22%; Yankee Roller, 30.22%	
High Grade, 40%; Trojan	40%
Jockey	25%

Snaths—

Grass Scythe	50@50.45%
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Snips, Tinner's—See Shears.**Spoons and Forks—****Silver Plated—**

Good Quality	50.10@60.45%
Cheap	60@60.10%
International Silver Co.	
1847 Rogers Bros.	40.10%
Rogers & Bro., William Rogers	50.10%
Eagle Brand	50.10%
Anchor, Rogers Brand	60%
Wm. Rogers & Son	60.10%

Miscellaneous

German Silver	60@60.45%
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Tinned Iron—

Tables	per gro.	\$0.50@1.0
Atlas Mfg. Co.:		
Tea Spoons, 30	gro.	50¢@55
Table Spoons, 30	gro.	\$0.90@1.0

Scythe Stones—

Pike Mfg. Co., 1907 list:	
Black Diamond S. S. 8. 3/4 gro.	\$12.00
Lamotte S. S. 8. 3/4 gro.	\$11.00
White Mountain S. S. 8. 3/4 gro.	\$9.50
Green Mountain S. S. 8. 3/4 gro.	\$7.00
Extra Indian Pond S. S. 8. 3/4 gro.	\$5.00
No. 1 Indian Pond S. S. 8. 3/4 gro.	\$7.50
No. 2 Indian Pond S. S. 8. 3/4 gro.	\$5.00
Leader Red End S. S. 8. 3/4 gro.	\$5.00
Quick Cut Emery. 3/4 gro.	\$10.00
Pure Corundum. 3/4 gro.	\$18.00
Crescent. 3/4 gro.	\$7.00
Emery Scythe Rifles, 2 Coat. 8.80	
Emery Scythe Rifles, 3 Coat. \$11.00	
Emery Scythe Rifles, 4 Coat. \$13.25	
Balance of 1907 list. 33 1/2%	
Lectro (Artificial). 3/4 gro.	\$12.00 33 1/2%
Lightning (Artificial). 3/4 gro.	\$12.00 33 1/2%

Stoppers, Bottle—

Victor Bottle Stoppers. 3/4 gro.	\$9.00
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Stops—Bench—

Millers Falls. 15410%	
Morrill's. No. 1. \$10.00. 50%	
Morrill's. No. 2. \$12.50. 50%	
Seymour Smith & Son's. 60%	

Door—

Chapin-Stevens Co. 50@50&10%	
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Plane—

Chapin-Stevens Co. 20%	
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Straps—Box—

Acme Embossed, case lots. 20&10&10%	
Cary's Universal, case lots. 20&10&10%	

Stretchers, Carpet—

Cast Iron, Steel Points. doz. 55¢	
All Steel Socket. doz. \$2.00@2.25	
Excelsior Stretcher and Tack Hammer Combined. doz. \$6.00. 20%	

Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and	
Lard Presses. 25@25&7 1/2%	
National Specialty Co., list Jan. 1,	
1902. 30&5%	
P. S. & W. Co. 40&10&5%	

Sweepers, Carpet—

Goshen Sweeper Co. Per doz.	
Gilt Edge. 27.00	
Superfine. 26.00	
Majestic. 24.00	
Select, Nickeled. 22.00	

National Queen, Nickeled. 27.00	
Martha Washington, Nickeled. 25.00	
Monarch, Japanned. 20.00	
Perpetual, Japanned. 18.00	

Streator Metal Stamping Co.: 25.00	
Model E, Sanitaire. 15.00	
Eureka. 15.00	
Streator Majestic, Nickeled. 24.00	
Streator Conqueror, Japanned. 22.00	

NOTE.—Leading Manufacturers give the following rebates from list prices, 50¢ per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks. 90&25%	
American Cut Tacks. 90&25%	
Siredes' Cut Tacks. 90&30%	
Siredes' Upholsterers'. 90&35%	
Gimp Tacks. 90&35%	
Lace Tacks. 90&35%	
Trimmers' Tacks. 90&30%	
Looking Glass Tacks. 65¢	
Bill Posters' and Railroad Tacks. 90&40%	

Hungarian Nails. 80¢	
Finishing Nails. 70¢	
Trunk and Clout Nails. 75¢	

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks. 90&6 tens@%	
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See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co. Oil	
Gal. Gasoline. 33.00	
30. 22.75 33.00	
60. 33.50 34.00	
110. 35.00 35.75	

Tapes, Measuring—

American Asses' Skin. 50¢	
Patent Leather. 35@30&5%	
Steel. 33 1/2¢	
Chesterman's. 25@25&5%	
Keuffel & Esser Co.: 40&10&30%	
Favorite, Am Skin. 40&10&30%	
Favorite, Duck and Leather. 25&5&10%	
Metallic and Steel, lower list, 35¢	
35&5%; Pocket, 35&5&5%.	

Lufkins: 40&10&50%	
Asses' Skin. 30@30&5%	
Metallic. 25&5&25&10%	
Patent Bend, Leather. 40@40&5%	
Steel. 33 1/2¢	

Wienbusch & Hilger: 33 1/2¢	
Chesterman's Metallic, No. 31L. etc. 25%	
Chesterman's Steel, No. 1038L. etc. 35%	

Teeth, Harrow—

Steel Harrow Teeth, plain or	
headed, 1/4-inch and larger	
per 100 lb. \$2.55 @ \$2.90	

Thermometers—

Tin Case, Cabinet, Flange,	
Dairy, &c. 30@35%	

Ties, Bale—Steel Wire—

Single Loop. 82 1/2¢@10%	
Monitor, Cross Head, &c. 70&5 1/2%	

Tinners' Shears, &c.—

See Shears, Tinners', &c.	
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Tinware—

Stamped, Japanned and Placed, sold	
very generally at net prices.	

Tire Benders, Upsetters, &c. See Benders and Upsetters, Tire.**Tools—Coopers—**

L. & I. J. White. 20@20&5%	
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Haying—

Myers' Hay Tools. 50%	
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Ice Tools—

Gifford-Wood Co. 15%	
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Miniature—

Smith & Hemenway Co.'s David-	
son, 3/4 doz., Nickel Plated, \$1.50;	
Gold Plated. \$2.00	

Saw—

Atkins' Cross Cut Saw Tools. 35&5%	
Simond's Improved. 33 1/2%	
Simond's Crescent. 30%	

Ship—

L. & I. J. White. 25%	
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Torches—

Hammers, Engine, 3/4 doz. \$1.50	
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Transom Lifters—

See Lifters, Transom.	
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Traps—Fly—

Balloon, Globe or Acme, doz.	
\$1.15@1.25; gro. \$11.50@12.00	
Harper, Champion or Paragon,	
doz., \$1.25@1.40; gro. \$13.00@13.50	

Game—

Imitation Oneida. 75@10%	
Newhouse. 50&5%	
Hawley & Norton. 65&10%	
Victor. 75@10%	
Oneida Community Jump. 70&5%	
Stop Thief. 60%	
Tree Trap. 60%	
Hector. 75@75&10%	

Mouse and Rat—

Mouse, Wood, Choker, doz. holes,	
12¢	
doz. 85¢@90¢	

Mouse, Round or Square Wire,

doz. 85¢@90¢	
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Marty French Rat and Mouse Traps

(Genuine), 3/4 doz.:	
Crate lots. Small lots.	
No. 1, Rat. \$11.50 \$14.50	
No. 2, Rat. \$5.75 \$6.50	
No. 3, Rat. \$4.70 \$5.25	
No. 5, Mouse. \$2.25 \$3.00	

Animal Trap Co.:

Out o' Sight, Mouse, 3/4 doz. \$0.60	
Out o' Sight, Rat, 3/4 doz. 1.20	
Easy Set, Mouse, 3/4 doz. .35	
Easy Set, Rat, 3/4 doz. .85	
Out o' Sight Chockers, 3/4 doz.	
holes. .12	
Out o' Sight, Tin, 5-hole, 3/4 doz.	
traps. .75	

Trowels—

Diaston Brick and Pointing. 25%	
Diaston Plastering. 20%	
Diaston "Standard Brand" and Gar-	
den Trowels. 30%	
Kohler's Steel Garden Trowels, 3/4 gro.	
5 in. \$4.80; 6 in. \$6.00.	
Never-Break, Forged Steel Garden	
Trowels, in bulk, net \$5.50	
In 1 doz. boxes. 3/4 gro. \$6.00	
Woodrough & McParlin, Plastering. 25%	

Trucks, Warehouse, &c.—

B. & L. Block Co.: 50&10%	
New York Pattern. 60&10%	
Western Pattern. 60&10%	
Handy Trucks. 3/4 doz. \$16.00	
Grocery. 3/4 doz \$15.00	
McKinney Trucks. each, net \$10.00	
Model Stove Trucks. 3/4 doz \$18.50	

Tubs, Wash—

M'fgr's list, price per gross.	
No. 0. 1 2 3	
Galvanized. \$67 \$79 \$91 \$103 10&7 1/2	
65&5% @—	
Prices low and irregular.	

Twine, Miscellaneous—

Flax Twine:	
No. 9, 1/4 and 1/2-lb. Balls. 21@23¢	
No. 12, 1/4 and 1/2-lb. Balls. 19@21¢	
No. 18, 1/4 and 1/2-lb. Balls. 16@18¢	
No. 24, 1/4 and 1/2-lb. Balls. 15@17¢	
No. 36, 1/4 and 1/2-lb. Balls. 15@17¢	
Chalk Line, Cotton 1/4-lb. 24@29¢	
Balls. 24@29¢	
Cotton Mops, 6, 9, 12 and 15 lb.	
to doz. 8 1/2@10¢	
Cotton Wrapping, 5 Balls to lb.	
according to quality. 13 1/2@19¢	
American 2-Ply Hemp, 1/4 and 1/2-lb. Balls. 13 1/2@15¢	
American 3-Ply Hemp, 1-lb. Balls. 13 1/2@16¢	
India 2-Ply Hemp, 1/4-lb. Balls. 7 1/2@9¢	
Balls (Spring Twine). 7 1/2@9¢	
India 3-Ply Hemp, 1-lb. Balls. 7 1/2@9¢	
2, 3, 4 and 5-Ply Jute, 1 1/2-lb. Balls. 9@11¢	
Mason Line, Linen, 1/2-lb. Bts. 17¢	
No. 26 1/2 Mattress, 1/4 and 1/2 lb. Balls, according to quality. 30@60¢	
Wool, 3 to 6 ply. B 6¢; A 7 1/2¢	

Vises—

Solid Box. 60@60&10%	
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Parallel—

Athol Machine Co.: 40%	
Simpson's Adjustable. 40%	
Standard. 40%	
Amateur. 35%	
Columbian Edw. Co. 40&5%	
Slide. 65%	
Fisher & Norris Double Screw, each.	
Nos. 2 \$10.50; 3 \$16.00; 4 \$20.50;	
5 \$27.00; 6 \$32.00. 15&10%	
Fisher-Brooks Bench Vises, No. 0.	
\$3.80; No. 1. \$5.80; No. 2. \$8.25;	
No. 3. \$10.50; No. 4. \$13.00. 15&10%	

Fulton Mach. & Vise Co.:

F. & R. Double Swivel Ma-	
chicists' 40%	
Star, Solid Jaw, Machinists' 40%	
Hollands' 40@40&5%	
Machinists' 40@40&5%	
Keystone. 65&5&70%	

Lewis Tool Co. 30%	
Adjustable Jaw. 30%	
Monarch, 50%; Solid Jaw. 50%	
Massey Vise Co.: 40%	
Clincher. 40%	
Parallel Bar. 15%	
Perfect, 15%; Lightning Grip. 15%	
Merrill's. 25%	
Millers Falls Oval Slide Pattern. 60&10%	

Parker's: 20@25%; Regulars. 20@25%	
Victor. 20@25%; Regulars. 20@25%	
Vulcan. 40@45%	
Combination Pipe. 55@60%	
Pratt. 20@25%	
Rock Island. 25%	
Snediker's A. L. 35&5%	
Stephens'. 35&5%	

Saw Filers

Diaston's D 3 Clamp and Guide, 3/4	
doz., \$24.00; 30%; Clamps. 30%	
Perfection Saw Clamps, 3/4 doz. \$1.50	
Reading. 60%	

Wood Workers—

Fulton Mach. & Vise Co.: 40%	
F. & R. Double Swivel Coach-	
man's 40%	
Star Solid Jaw Woodworkers' 60%	
Massey Vise Co.: 20@25%	
Lightning Grip. 15%; Perfect. 15%	
Wyman & Gordon's Quick Action, 6	
in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.	

Miscellaneous—

Fulton Machine & Vise Co., Com-	
bination Pipe. 70%	
Holland's Combination Pipe. 60@60&5%	
Massey's Quick Action Pipe. 40%	
Parker's Combination Pipe:	
87 Series. 60%; 187 Series. 60&5%; No.	
870. 40%	
Rock Island Pipe. 25%	

Wads—Price per M.

B. E., 11 up. 60¢	
B. E., 9 and 10. 70¢	
B. E., 8. 80¢	
B. E., 7. 80¢	
P. E., 11 up. \$1.00	
P. E., 9 and 10. 1.25	
P. E., 8. 1.50	
P. E., 7. 1.50	
Ely's B. E., 11 and larger \$1.70@1.75	
Ely's P. E., 12 to 20. \$4.00@3.25	

Ware, Hollow—

Cast Iron, Hollow—	
Stove Hollow Ware:	
Enameled. 45&10%	
Ground. 50&5%	
Plain or Unground. 60%	
Country Hollow Ware, per 100	
lbs. \$2.75@3.00	
White Enameled Ware:	
Mashin Kettles. 65&10%	
Covered Ware:	
Tinned and Turned. 35&10%	
Enameled. 45&10%	
See also Pots, Glue.	

Enameled—

Agate Nickel Steel Ware. 33 1/2%	
El-an-g. 60&10%	
Iron Clad Ware. 70&10%	
Lava and Volcanic, Enameled. 40&10%	

Tea Kettles—

Galvanized Tea Kettles:	
Inch. 6 7 8 9	
Each. 45¢ 50¢ 55¢ 65¢	

Steel Hollow Ware—

Avery Stamping Co.: 65&10%	
Never-Break Spiders and Grid-	
dies. 65&10%	
Steel Kettles, Mashin Scotch	
Bowls, Tin'd. 60%	
Steel Stew Pans, Stew Pots, etc.	
Porcelainized. 34%	
Cleveland Stamping & Tool Co.: 34%	
Solid Steel Spiders and Grid-	
dies. 65&5%	
Solid Steel Kettles. 60&5%	

Warmers, Foot—

Pike Mfg. Co., Soapstone. 40@40&10%	
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Washboards—

Miscellaneous—
Fulton Machine & Vise Co. Com-

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